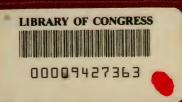
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THE

INDUSTRIAL INTERESTS

OF NEWARK, N. J.,

CONTAINING AN

HISTORICAL SKETCH OF THE CITY,

-ALSO-

A COMPLETE SUMMARY OF THE ORIGIN, GROWTH AND PRESENT CONDITION OF NEWARK'S INDUSTRIES.

-INCLUDING-

THE LOCATION AND DESCRIPTION

OF ALL THE

MANUFACTURING ESTABLISHMENTS.

BY WILLIAM F. FORD.

NEW YORK:
VAN ARSDALE & COMPANY, PUBLISHERS,
1874.

FIA-A. NOFG

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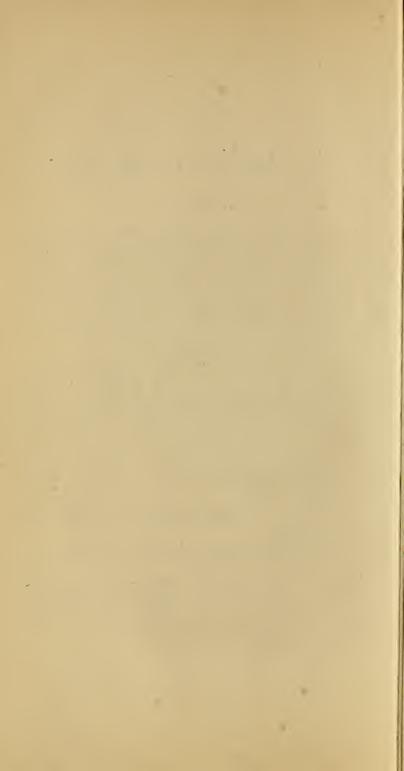
PREFACE.

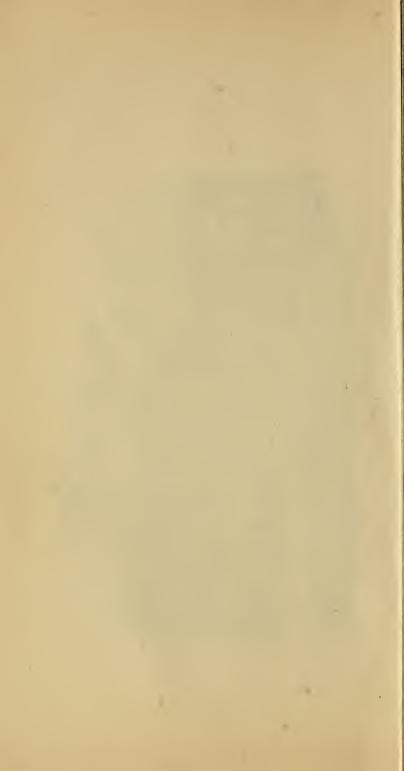
In the preparation of the following pages the design has been to give a succinct account of the history and characteristics of each industry, together with careful statistical summaries of each branch of manufactures. No attempt has been made to give the amount of capital invested, it being a matter of little importance to the world at large, who have only to deal with results, and not the means of reaching them. The statistical information given has been acquired through personal interviews with each manufacturer, and in nearly every instance the figures have been verified by reference to the books of the firm; their accuracy, therefore, is beyond question.

It needs no specious argument to show that the following work is an innovation in the industrial literature of the country. No similar attempt has previously been made in the interest of any manufacturing city. That the effect of such a work is in general beneficial to the interests of a city, and hence, of great value to each individual manufacturer is obvious. That his material welfare and that of the city in which his wares are produced are identical is manifestly plain. Next to spreading accurate information concerning the various products of his factory, a manufacturer should avail himself of every opportunity to contribute to the popularity of his city abroad as one of the world's greatest workshops.

Should this volume add to the renown which Newark has already achieved as a centre of industry and mechanical skill, the purpose of the publishers will have been accomplished.

The labor requisite for compiling and preparing for publication the succeeding pages can scarcely be overestimated. The great magnitude of the task has, however, been materially lessened through the valuable suggestions received from Col. Robert S. Swords, the obliging Secretary of the Newark Board of Trade, and the courtesy of Mr. Wilham E. Layton of the Newark Library. Our thanks are also due for the cordial support and encouragement of the enterprising press of Newark.



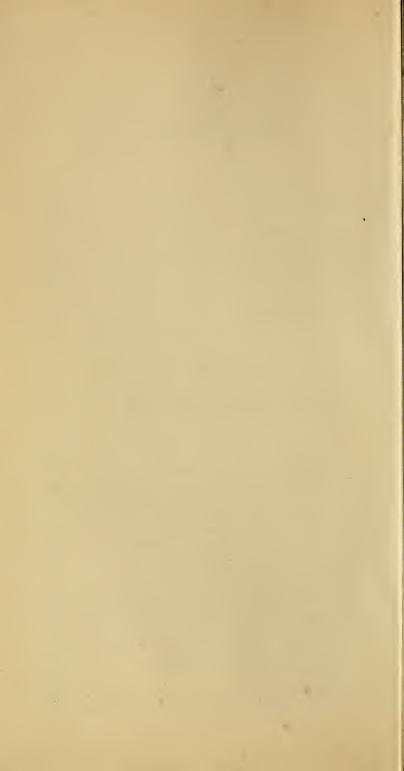


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NEWARK, N. J.

The first commercial and manufacturing town of New Jersey is the City of Newark in the northeastern part of the State on the west bank of the Passaic river three miles from its entrance into Newark Bay. Newark is situated nine miles west of New York, fifty-nine from Trenton, the State capital, seventy-eight from Philadelphia, two-hundred and sixteen from Washington and about forty-five miles from the northern boundary of the State, in latitude 40° 44' North, longitude 74° 10' West.

The site of the city is one of the most attractive and delightful localities in New Jersey. Eastward toward New York are broad and level meadows, not unlike a western prairie, traversed by the Passaic and Hackensack rivers, while beyond, rising abruptly in the distance, are the historic Bergen Heights. The land on which the city proper is built lies many feet above the Passaic river, and in the western portion is sufficiently undulating to suggest the picturesque. At this point the Passaic, coming down from the north, makes a wide sweep westward, and thus Newark is built, as it were, on the outer rim of a semi-circle within which, across the river, is East Newark an offspring of the older town. Westward from the city, into and beyond Essex county, of which Newark is the capital, the land rises rapidly until a culmination is reached in the far-famed Orange Mountains which traverse the central part of the state. The intervening country is scarcely equaled for fertility of soil, beautiful scenery and healthful climate. It is thickly dotted with attractive villages, surrounded by highly cultivated and fruitful farms. Years of continuous cultivation have made this portion of New Jersev little less than a blooming garden.

Newark in the main is regularly laid out, and has wide and well-paved streets adorned with grand old elms, which are forcibly suggestive of the typical New England town. Unlike a western city which has grown up within a few years, hence presenting a uniform appearance, Newark on account of its great age has many architectural anomalies. Here is a building of another century, and there an elaborately ornamented structure illustrating the ornate architecture of to-day. Broad-street, the main business thoroughfare, extending north and south through the central part of the city, has many fine business blocks. The south part of this street, lined with mag-

nificent elms, is one of the most beautiful avenues in the country. Midway at the intersection of Broad and Market streets is the centre of the city's trade and commerce. The bank buildings are especially attractive. In addition, the buildings erected by several of Newark's prosperous insurance companies are worthy of notice. Newark in many respects even now is unsurpassed as a beautiful city. The structures built in an early day are fast disappearing and in their places are building stores and blocks for offices which, are the outgrowth of that taste and cultured refinement which spring from accumulations of wealth. When these changes shall have been completed, the City of Newark will have no superior in the country for finished and elaborate architecture. Outside of the central streets, and even there they are not absent, the observer is struck with the frequency of manufacturing establishments. These are the absorbing feature of Newark, whose chief glory and source of prosperity are her manufactures. The buildings are mostly neat brick structures erected in a substantial manner, thus securing permanence with economy.

Newark has now reached a population of about 130,000, and as its rapid growth will soon give it a metropolitan character the number and extent of the public parks possess an absorbing interest. It is gratifying to find that the city is not without these breathing places. Military Park on the east side of Broad-street near its centre, and Lincoln Park towards the south at the intersection of Broad-street and Clinton Avenue are delightful retreats from the heat of summer, the former being deeply shaded with the majestic elms of which Newark may well be proud. Although these parks are perfect in their way they are insufficient for the wants of Newark. A movement is on foot, however, to provide ample grounds for public recreation before the population of the city has become so dense, and land so valuable as to form an insuperable obstacle in the way of the desired result. It is hoped that any adequate plan which the enterprising citizens of Newark may have in view, will meet with the fullest success.

Newark has a present area of about eighteen square miles. The city's circumference is about sixteen miles; its length from north to south five and a half, and its breadth from east to west five miles. The suburbs are very extensive and attractive. On the west they extend to Orange, and within a mile of Elizabeth on the south. The suburban villages are in fact so numerous, and the country between so slight in importance that it has been proposed to unite them all, including the countres of Hudson and Essex and the cities of Elizabeth and Paterson, under one corporation the whole to be known as the City of Newark.

The character of a city is very often judged by its hotels. To estimate Newark thus would result in gross injustice. Owing to unfavorable circumstances it has nothing to boast of in this direction. The principal

causes of this serious defect are perhaps, first, its proximity to New York, and second, a love for domestic life and home comforts which looks with distrust on the privations incident to hotels; the former explains the absence of strangers who prefer the more stirring scenes of the neighboring metropolis, while the latter completely negatives what is known as a hotel population. The two principal hotels at present in operation are the Continental and the Park House.

Newark like Brooklyn is a city of churches, and its people are a church going community. Some of the causes which gave rise to this healthy moral and religious sentiment may be mentioned hereafter. The church edifices are as a rule commodious, and attractive in appearance They are usually built of brown sand stone and in point of architecture are in keeping with good taste, fortunately lacking that "loud" tone which so disgraces many metropolitan churches, the result of superfluous and vulgar wealth which for want of culture lacks a better expression. The city has a commodious theatre in the Newark Opera House at the corner of Market and Halsey streets. The variety of entertainments given is of the first order, but the fullest success is in a measure prevented by the nearness of New York where are to be seen the best effects of the histrionic art. By the aid of street cars the means of local travel are ample. The various lines traverse nearly all parts of the city, and through them are secured intimate relations with the suburbs.

Amid the natural surroundings and "advanced" ideas of to-day there is danger of forgetting the lessons of the past in the hurry and excitement incident to the mad rush after wealth and fame. Instead of studying the records of yesterday that a solution of the problems of to-day may be reached in the light of experience, many of our pseudo politicians and philosophers with an egotism known only to modern democracy, rely solely on their inner consciousness for a complete and satisfactory answer to the most intricate questions, when the result as influencing legislation affects the condition of millions of people for good or evil. These modern savans, judged by their published thought and actions, affect to believe that the fact of a social theory or governmental policy having been tried in the past under as favorable conditions as are now afforded, does not militate against its success in the nineteenth century, their chief reason being that this is "a glorious country." The logic of events has no terrors for them. In their abhorrence for statistics and historical data these philosophic politicians manifest a remarkable inability for collating and understanding the most simple facts. He who scorns the value of vesterday will contribute little of permanence to the history of to-day. Intellectual bubbles are as evanescent as their gaseous counterparts. Some one has said that a young man's chances for success in the great world of thought and morals may be accurately foretold by the estimation and reverence in which he holds the great record of human achievements, as shown on the pages of his-

tory. Youth is sophomoric, and when surrounded by naught which bears the impress of age the tendency is to throw aside facts and premises in the formation of conclusions, reaching them by an intuitive process known only to its deluded possessor. That a great city should be built up and reach the full tide of architectural splendor in two years, is marvelous. It is a material acchievement of which any country may well be proud. But that such surroundings are conductive to intellectual and moral greatness is not susceptible of proof. The young man then whose aspirations are intellectual and moral is fortunate, if born and reared in a city rich in historical associations. He lives in an atmosphere congenial to the highest intellectual results. He is surrounded by a reverence for the heroes who have preceded him and an admiration for their valorous deeds. He unconsciously absorbs this feeling of reverence, and it becomes to him a perennial fountain of inspiration. Men talk and write of the dead past. The past is not dead but liveth, and will continue to live so long as the mistakes and misdeeds of yesterday are a lesson and warning to the men of to-day. In the light of these truths a brief glance at the history of Newark becomes doubly interesting.

Hudson discovered the river which bears his name in 1609. The settlement of New Amsterdam, afterwards New York, by the Dutch, immediately followed, and the province of New Netherlands extending from Albany south to Cape May, including what is now known as New Jersey, took shape and direction under the control of Holland, then a great maritime power. During the succeeding half century, the village of New Amsterdam and the colonies along the Hudson river flourished apace. Down to the beginning of the seventeenth century the efforts which had been made to colonize New Jersey had resulted in nothing of significance. Save a few Dutch and Swedish settlements on the Delaware river, and a trading station at Bergen, mentioned in 1618, New Jersey was yet a wilderness, inhabited only by the Indians, who had roamed over its beautiful hills and fertile valleys from time immemorial. The eastern shore, whose picturesque beauty had attracted Hudson, was hardly known, except in his reports, while to the west, along the upper Delaware, the white man had scarcely penetrated. It is related, however, that some of Hudson's hardy crew, in their varied explorations, crept through the Kill-von-Kull at the north of what is now Staten Island, and entering Newark Bay, passed northward into the Passaic river. The beast and savage only were there to welcome them. On their return, they reported "very good riding for ships, and a narrow river to the westward, between the land; the land was pleasant with grass and flowers and goodly trees, as ever they had seen, and very sweet odours came from them." The irrepressible Dutch traders, in their intercourse with the natives, were no doubt fully cognizant of the boundless possibilities of the country between New York Bay and the Delaware

whose fairest spot was destined to form the site of the city whose wondrous growth and industrial development this volume records.

As already indicated, the Dutch settlements on Manhattan Island and the Hudson, were in the main prosperous. By right of discovery the priority of title to all the lands in North America on the Atlantic coast had been claimed by England. The Dutch were therefore regarded as pretenders, or rather, lawless adventurers. During the interval between 1620, when the Pilgrims landed in New England, and 1660, the settlements in Massachusetts and Connecticut had so grown and prospered that encroachments were making towards the west on the Dutch villages which had been springing up along the Hudson. The Commonwealth in England under Cromwell had just been succeeded by the accession of Charles II, to the throne. At this time England was envious of the commercial glory and prosperity of Holland. The new king therefore, desirous of promoting England's renown, and thereby adding to his own, declared war upon Holland and all her reputed possessions. New Amsterdam and the province of New Netherlands were the first to succumb. In 1664 the Dutch and Swedes on the Delaware capitulated, and England was again in complete control of the Atlantic coast. The title of England to these immense possessions was formally acknowledged by Holland, by the peace of Breda, in 1667. Two months previous to the forcible seizure of New Amsterdam, in 1664, King Charles granted to his brother James, the Duke of York, all the lands between the Connecticut river and Delaware Bay. In honor of this great landowner, the name of New Amsterdam was changed to New York. In 1664 the Duke of York assigned to Lord John Berkley and Sir George Carteret, all lands between the Hudson and Delaware rivers. To this tract the title of New Casarea or New Jersey was given. In this act, if to fix the boundaries and grant the soil could constitute a State, the Duke of York gave political existence to a commonwealth. Philip, a brother of Sir George Carteret, was the first governor of the new province. He landed at a a point now called Elizabethport, in 1665, the place being named in honor of his brother's wife. Of course the first move of the proprietors was to effect a colonization of this new territory. As previously indicated, the Dutch had made no settlements west of Hackensack, Newark Bay and the sound between Staten Island and the main.

The early history of the State has thus been briefly sketched that a ray of light may be thrown on the subsequent settlement of Newark. The inducements held out by the proprietors for immigration to New Jersey, form in the light of the immediately preceding events an historic anomaly. The siezure of New Netherlands by England was prompted by a spirit of aggressiveness antagonistic to the genius of liberty. The seizure was an act of foreign conquest regardless of the resulting pain and misery inflicted on humanity. Yet

strange as it may appear, the first act of the new governor was to prepare a form of government liberal in the extreme. The unequalled success and glorious triumphs of the New England Puritans in subduing the wilderness that their peculiar ideas and forms of religion and government might have a home forever secure from the interference of priest or king, had commanded and received the world's homage. The spirit of liberty was in the air. And the Governor of New Jersey, while in reality the tool and emissary of despotic royalty, proceeded with commendable foresight to make the most of the situation. The New England settlers not content with cultivating their sterile soil, had become restless and desirous of removing to new fields of enterprise, where agricultural labor and industrial skill might secure a more adequate reward. In the colony of New Haven especially this feeling was intense, chiefly on account of enforced annexation to that of Connecticut, Taking advantage of this favorable condition of things, the Lords Proprietors of New Jersey prepared a bill of "concessions and agreements" to all settlers and "adventurers" as might choose to unite their fortunes with New Jersey. Grants of land were offered on the most favorable terms, and local self-government with the utmost freedom of conscience were guaranteed to all. These "concessions" were published in the New Haven colony. Thus, in the language of Bancroft, did avarice render homage to liberty. The people of the New Haven colony had already been looking toward the fertile soil of New Jersey with ardent hopes, having made overtures to the Dutch at New Amsterdam previous to its surrender; hence the propositions of Governor Carteret were favorably received. A delegation, under the leadership of Captain John Treat, was sent from Milford to enquire concerning the new territory and its promised advantages. On reaching Elizabeth these earnest men in quest of a promised. land went south, the design being to select a site for the new town near what is now Burlington. A more intimate knowledge of the country changed their plans, and on returning they proceeded Northward. Here they were to find the realization of the cherished hopes. Sailing into the quiet waters of Newark Bay they soon reached a spot exactly suited to their desires: a fertile soil, beautiful woodlands and a navigable stream, while away to the eastward was a wide and sheltered bay destined at a future day to shelter the world's commerce. It was decided, therefore, to choose this for the place of settlement. A large tract was selected "beyond the marshes to the north of Elizabethtown." The purchase was liberal, the land being secured, after a free occupation of five years for a quit of a half-penny per acre. In May, 1666, the first band from Milford reached the site of the future City of Newark. And thus through a chain of fortuitous circumstances was the settlement of Newark brought about. They numbered about thirty families, John Treat being the Captain of this valiant band. Hardly had they secured a landing when a serious obstacle intervened. The Indians interfered, with

the complaint that the land had never been purchased from them. It was expected that Carteret would have provided for this emergency, and the disappointment came near resulting in an abandonment of the enterprize. However, a conference on the Hackensack was held with the natives which resulted satisfactory to all. A fair bargain was concluded and provision made for a bill of sale. Following this amicable adjustment of difficulties the settlers experienced no further trouble with the natives. Thus was secured a double title to the land and the future good will of the Indians. The transaction was not concluded until the following year. It bears date July 11th, 1667, and the land transferred corresponds very nearly with the present county of Essex. It is interesting to note in these days of paper currency and rapid interchange of values, that the consideration of the land consisted of "fifty double-hands of powder, one hundred bars of lead, twenty axes, twenty coats, ten guns, twenty pistols, ten kettles, ten swords, four blankets, four barrels of beer, two pair of breeches, fifty knives, twenty hoes, eight hundred and fifty fathoms of wampum, two ankers of liquor, or something equivalent, and three troopers' coats." this policy of fair dealing with the first owners of the soil is suggestive in many ways. It stands out in sharp contrast with the policy pursued by contemporary colonies. Chiefly through this act of justice the City of Newark ever after enjoyed immunity from savage inroads and scalping excursions. A few years later a second purchase was made by which the limits of Newark were extended westward to the top of Orange Hill, the equivalent being "two guns, three coats, and thirteen cans of rum." Closely following or accompanying the first settlers came a delegation from Guilford and Brandford, neighboring towns of the New Haven colony, to examine the ground and, if agreeable, provide for a union of interests in the new home. The first entry in the records of Newark as published by the Historical Society of New Jersey bears date May 21, 1666, and contains an account of the conference with the men from Guilford and Brandford. It was agreed that their fortunes should be united "according to fundamentals mutually agreed upon" During the following year the proposed union was effected, the second delegation being equal in numbers to the band from Milford. It appears that the men of Guilford and Brandford were more potent than their predecessors in moulding the forms and modes of government for the new town. Previous to their departure from New England they held a meeting and prepared the "fundamental agreements" expressive of their political and religious views. They were devoted Puritans and imbued with all the peculiar notions which that name implies. The agreements provided, first, that the purity of religion as professed by the Congregational Church should be maintained; that none should be admitted free burgesses of the town or chosen to the magistracy, or have a vote in the establishment of laws, or be eligible to

any chief military trust except those who were members of some or other of the Congregational Churches; such ordinary civil rights as were left being extended to all other settlers. These resolutions were unanimously subscribed to at a public meeting on the Passaic, June 24th, 1667. The whole number of signatures was sixty-three. Thus were the chief features of the New England codes transferred to the statute book of New Jersey. Such restrictions are regarded now, in the words of Buckle, as relics of a by-gone age. It should not be forgotten, however, that those were troublous times, a period of great intellectual and religious excitement Men were governed by dogmas, and reason was decried. In spite of boasted liberty, an ecclesiastical terrorism was maintained. The world was regarded as "a city of destruction, possessed with a very ill-conditioned and idle sort of people." Measures which at this distance seem the veriest intolerance, were adopted by the sterling men of those days in self defense. religion with all its persecutions and terrorisms had a basis of right living. Religious hypocrisy was not then so common as now. Individual worth and purity are the basis for all reform. And to this end Puritanism was a grand step onward toward a higher civilization and nobler life. Puritanism bridled the passions, commanded the virtue of self-denial, and rescued the name of man from dishonor. Bancroft says, "the maturity of a nation is but the continuation of its youth." and as this principle applies quite as well to the growth of a city, one can scarcely overestimate the never-ending beneficial influence of those city fathers in shaping the character of Newark. local writer says, "if we, their descendants, have among us anything of purity and truth, or respect for law and justice, it is probable that to their influence and example we owe their existence."

Settlers from Brandford came rather as a Church than as individuals, under the leadership of their pastor, the Rev. Abram Pierson. For a time the embryo city was called Milford, or, simply, "our Town on the Pesayak." The place as finally named received its title in honor of Mr. Pierson, who had come hither from an English town bearing the same name. The first church built was in 1669. It was a primitive structure 26 feet wide and 36 feet long. It is worthy of special mention as being the initial point for a church which has preserved its historical continuity from that time till now. Its organization was at first Congregational, but since 1719 it has been known as The First Presbyterian Church of Newark. It has had a long line of celebrated names among its ministers, one of whom was the Rev. Aaron Burr, illustrous father of a degenerate son. The elder Burr was for a time President of Princeton College. The history of this Church is replete with historic associations, but want of space forbids a more extended notice. The first school was in 1676. A saw mill was first mentioned in 1695. In the early days of Newark

barter was almost the sole means for effecting exchanges. The money of Holland and England was in circulation, but little of it reached a settlement so remote. It is interesting to note the social friction consequent upon the gradual but continuous accessions to population. Under these influences the bonds of church discipline were visibly weakened. To remedy this state of things resort was had to the statute book, a forlorn hope, as a means of effecting moral reforms. The "indiscriminate receiving and entertaining of strangers" was frowned upon. In fact, serious obstacles were thrown in the way of immigration. It was thought that by seclusion only, could their peculiar religious forms and customs be preserved intact. They seemed not to know that a religion which cannot withstand the surging tide of humanity is not worth preserving. Gradually but surely the Newarkers learned to gladly welcome to their city, people from every clime and of discordant opinions. Information was being diffused among the masses, and science was advancing with rapid strides. Men learned that the key-note of advancing civilization was the utmost toleration in matters of opinion. The true reformer was in the fullest sense a Catholic.

* * * "Through the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns."

Down to the Revolution Newark grew and prospered. It was usually free from the troubles which agitated other New Jersey colonies on account of disagreements with the proprietary powers. Another war having occurred with Holland, New York surrendered on July 30, 1674, and the subjugation of New Jersey immediately followed. Allegiance was demanded of Newark, and as seventy-three took the oath, it appears the submission was general. However, by the treaty of Westminister, of February 9, 1674, England regained control of New Jersey and Philip Carteret returned as Governor. Newark is reported, in 1681, as the most compact town in the province, with a population of 500; having 10,000 acres of town lands and 40,000 acres of plantations. In 1713 Queen Anne granted a charter of incorporation, thus making the township of Newark a body politic. It remained in force until 1798. As a result of the continued prosperity several religious denominations antagonistic to the old church were established. Episcopal services were held in 1729. Trinity Church was completed about 1733 and other churches were called into existence as a result of the growing liberality of the town. The first Baptist Church was founded in 1801. The first Methodist Episcopal in 1806, and the first Roman Catholic dates from 1824. Newark now began to reap some of the benefits accruing from its fortunate situation. New York was fast becoming a great mart of trade. The proximity of Newark gave it great advantages. During the Revolution Newark was a great sufferer, owing to its location on the main line of communication between the north and south. After

the battle of Long Island, in 1776, Washington and his army of 3,000 men were quartered for a week on the city. The town was frequently occupied by each of the opposing forces. It was obliged to furnish subsistence and submit to the inroads of foraging parties. With the close of the war Newark entered on a new and more prosperous era. A decade added to its population a larger increase, than a century had done before. The means of communication with New York had been improved in 1765, and in 1795 bridges were built over the Passaic and Hackensack. In 1798 the township of Newark received a new charter. The town entered on the present century in prosperity and peace. In 1806 Newark was described as a flourishing, wellbuilt village. The war of 1812 did not seriously effect it, and from that time till now the story of its progress is mainly one of continued good fortune. It is difficult to get accurate statistics of the city's condition in the early part of the century. The population in 1810 is reported as 6,000, in an early directory of the city. A census was taken in 1826 when the population numbered 8,017. Newark contained then 844 houses, 207 mechanic's shops, three lumber yards, and four quarries. The product of the latter consisted of brown free stonea valuable building material—the quarrying of which has since become an important industry.

In 1830 Newark contained a population of 11,000. From this date its rate of progress became more rapid, which, however, was only an incident in the general increased prosperity of the whole country, consequent in a great measure on the introduction of the steam engine, the locomotive, and general laborsaving machinery. In 1836 the place was incorporated as the "Mayor and Common Council of the City of Newark." William Halsey was the first Mayor. May 17th, 1866, the Bi-Centennial of the settlement of Newark was observed with appropriate ceremonies by the New Jersey Historical Society. It was a memorable occasion and a day of general rejoicing. The allotted space will not permit our giving a continuous narrative of the city's history during the last forty years. It is only necessary to say that its steady growth in population, and rapid increase in wealth and influence, have met with no serious interruption. Newark occupied a prominent place in the history of the late war. In men and means her citizens were lavish in the extreme. The city's industries were brought into renewed activity in the production of supplies for the army. At the present time, Newark ranks as the thirteenth city of the Union in population, and the third in manufactures. The following tabular statement of the growth in population is very suggestive:

| Year. | Est. Pop. | Year. | Est. Pop. |
|-------|-----------|-------|-----------|
| 1800 | 4,500 | 1850 | 38,882 |
| 1810 | 6,000 | 1851 | 40,000 |
| 1826 | 8,017 | 1852 | 44,000 |
| 1830 | 10,995 | 1854 | 52,000 |
| 1833 | 15,000 | 1855 | 53,500 |
| 1835 | 18,201 | 1856 | 57,000 |
| 1836 | 20,376 | 1857 | 64,000 |
| 1840 | 17,202 | 1859 | 66,000 |
| 1841 | 18,720 | 1860 | 71,941 |
| 1842 | 18,800 | 1861 | 73,000 |
| 1843 | 20,200 | 1862 | 70,000 |
| 1844 | 23,187 | 1863 | 68,000 |
| 1845 | 25,433 | 1864 | 70,000 |
| 1846 | 26,000 | 1865 | 87,000 |
| 1847 | 28,000 | 1866 | 94,000 |
| 1848 | 30,000 | 1870 | , |
| 1849 | 32,000 | | , |

The population for 1874 is accurately estimated at 130,000. The foreign element numbers 35,884. In 1890, at the present rate of increase, Newark will have a population of 200,000, and in 1900, quite 250,000. Having thus briefly followed the growth of Newark, we come now to speak of its present condition, which merits a brief summary.

Much may be truthfully written of the advantages possessed by an industrial town as compared with those of a commercial or agricultural community. The last mentioned was first in the order of civilization. Man's first possessions were the direct products of the soil. That people living continuously in one place might possess the various articles resulting from differences in climate and peculiarities of soil an interchange of productions became necessary, and thus arose commerce. At this stage of the world's progress, owing to the accumulations of nature's products, men first had leisure; with leisure came the cultivation of the intellect, when men began to analyze and compare the various commodities, in order to learn what changes in character and form, and combinations of different articles, were possible, to the end that means might be attained for gratifying the added desires and wants of man; thus mechanical skill was quickened into life and activity, and thence arose industry. Agriculture, Commerce and Industry thus are typical of three grades of civilization, the last mentioned being latest in order of appearance, but first in culture and refinement. It is then but the fulfillment of nature's edict that the industrial community is peculiar to modern civilization. With the diffusion of knowledge and the advancement of science, came the development of manufactures. No

- country more forcibly illustrates the truth of our first statement than the United States. Here are the finest types of the manufacturing village or city. Nowhere are there industrial communities possessing so high an intellectual and moral tone. They are the natural outgrowth of our democratic institutions, and are the strongest testimonial to the inestimable benefits conferred upon humanity by our republican form of government. No American city more clearly shows this to be true than the subject of this sketch. From the early settlement its growth lay in the direction of manufactures. It appears that the early settlers were in the main artizans. Thus early in the history of Newark was the foundation laid for a healthful growth in the direction of a high social order. The development has kept pace with the city's advancing prosperity. At its inception the social status and intelligence of Newark was above the agricultural community, and it has been in the main free from the feverish demoralizing influences of the speculation incident to a commercial city. Newark to-day is among the foremost cities of the Union in intelligence, culture and refinement. Its people are provident and thrifty, as the deposits in the savings banks clearly show. The public schools of Newark are of a high order. There are belonging to this city twenty-two public school houses, whose estimated value, including sites and furniture, is \$720,000. There are three industrial and five evening schools. One of the most prosperous institutions of the city is the Newark Library Association, which was incorporated in 1847 and opened in 1848. The Library building occupies a central position on Market-street, west of Broad. It is a handsome and convenient edifice, having ample accommodations for a library and reading room, with a commodious hall, suitable for lectures and amusements. The present librarian is Mr. Wm. E. Layton. The value of the real estate and building belonging to the Association is estimated at \$100,000. There are 20,000 carefully selected volumes now on the shelves. The library is well supplied with works of reference, and has the usual supply of books for popular reading. The facts show that a great demand for the books exists, the reading public of Newark being very large.

The New Jersey Historical Society, a State Institution has its home in Newark, and occupies elegant rooms at the corner of Broad and Bank streets. It was founded in 1845, its object being "to discover, procure and purchase whatever relates to any department of the history of New Jersey, natural, civil, literary, or ecclesiastical, and generally of other portions of the United States." The beneficial influence of the society has been sensibly felt througout the State; it has printed and circulated a number of valuable volumes, and acquired a collection of local and State history of about 5,000 volumes and 8,000 pamphlets. The president of the society is the Rev. Ravaud K. Rodgers of

Bound Brook, and the corresponding secretary is William A. Whitehead of Newark.

Being so close to New York, the press of Newark is obliged to compete with the great metropolitan dailies, nevertheless, the several daily and weekly journals are a credit to the energy and enterprise of Newark. Local matters are fully reported and evidence is shown of much editorial ability, the literary features of the papers being of a high order.

The proximity of Newark to New York, and the comparative cheapness of rents and building sites, has made the city the home for many New York business men. The means of communication with the metropolis are ample. More than eighty trains leave Newark daily for New York by the various roads.

The nearness of New York again, affects the trade and commerce of Newark. Rapid transit makes Newark a suburb of the metropolis, and the large stocks and magnificent stores of Broadway are irresistible. Thus the local trade of Newark is much less than that of interior cities of the same size. For the same reason the wholesale trade is quite limited in extent. It is quite probable that this feature of the city will continue. New York will be the base of operations, and there, in the main, are the warehouses and salesrooms for Newark's products.

The direct sales and exports from Newark are less now than in The railroad connections of Newark with all parts of the country are ample. The shipping, however, is inconsiderable. Efforts are being made for the improvement of navigation in the Passaic river that thereby the city's direct trade with the world may be increased. The merchants and manufacturers of Newark have shown their appreciation of combined efforts in the organization of the Newark Board of Trade. The president of the Board is Mr. Chas. E. Young; Col. Robert S. Swords is its obliging secretary. Newark is one of the best governed cities in the country. It has been almost entirely free from political corruption which so disgraces other cities. Only the most efficient and upright men are elected to offices of trust and honor. Hon. Nehemiah Perry, ex-member of Congress, is the present Mayor. As a result of this excellent condition of municipal politics the fire and police departments of the city are models of their kind. No fire department in the world is better organized or more efficiently managed than that of Newark. Many of the first residents of the city are in its ranks. Its management is entirely freed from political influence, and those politicians who hold that "to the victor belong the spoils," cannot claim the fire department of Newark as a part of their booty. Its present perfect working condition is mainly due to the great executive ability and fidelity of Ellis R. Carhuff; the chief engineer. Had Chicago possessed so efficient an officer at the head of its fire department, its last great fire would have been suppressed in its incipient stages, and the city would not now have

to mourn the loss of millions of property as a just punishment for municipal corruption. During 1873 the total losses by fire in Newark were only \$114,805. For years the city has been virtually free from destructive conflagrations. Newark is emphatically a well-built city, and from its fine appearance, and the extent and nature of public improvements it is evident that its citizens ard not parsimonious in appropriating money. Notwithstanding, the rate of taxation does not exceed two per cent. For 1873 it was 1.98, but the average is much lower.

The following table shows the valuation in the city for the last ten years:

| Valuation. | Increase. |
|------------------|--------------|
| 1865\$35,646,000 | |
| 1866 50,866,700 | \$15,220,700 |
| 1867 54,917,200 | . 4,050,500 |
| 1868 62,794,957 | . 7,877,757 |
| 1869 72,058,436 | . 9,263,479 |
| 1870 77,015,279 | . 4,956,843 |
| 1871 86,985,341 | . 9,970,062 |
| 1872 97,330,341 | . 10,345,000 |
| 1873102,047,840 | . 4,717,499 |

The failure of a Newark banking establishment has never been recorded. The integrity of all officers has been above suspicion. The banks of the city are among the heaviest in the country. There are twelve banks, with an aggregate capital of \$5,783,500. Newark has also five savings banks, whose total assets are \$21,572,029. Newark is also noted for its safe and prosperous insurance companies. There are three life insurance companies, whose total assets are \$30,141,486. Sixteen fire insurance companies, whose combined capital is \$5,681,426. The total capital and assets of the financial institutions of Newark are \$63,179,042. Few cities of equal size can make as good a showing.

The general statements here made are an eloquent tribute to the sterling worth and energy of Newark's merchants and manufacturers. Favorable circumstances are no doubt powerful allies in municipal progress, but unless utilized by men of foresight and untiring industry, the results will be of little moment. But with the two conditions combined, the possibilities are almost boundless. It is beyond contradiction then, that the future growth of Newark will excel even the most ardent hopes of her busy people. Her industrial destiny as the Birmingham of America is assured.

MANUFACTURES.

Statistics as to the growth of Newark's Manufactures are not easily obtainable. Doubtless the first element in their growth was the character of the early settlers. The most trustworthy sources of information show that they were in the main mechanics and artizans. The records show that in 1676 efforts were made to promote the introduction of manufactures. With this favorable tendency the admirable situation made the industrial growth of Newark a certainty. Its close proximity to New York, the largest market in the Union, with shipping facilities to every quarter of the globe, with the great iron and coal fields easy of access, low taxation and a thrifty people, Newark drew to her mills and factories abundant capital and skilled workmen. The records of the patent office show that the citizens of Newark have contributed more useful inventions to industrial progress than any other American city. During 1873 upwards of one hundred patents were issued to citizens of Newark. Newark inventor is worthy of personal mention. To Seth Boyden, an inventor of the highest order, Newark, and, in fact, America, is greatly indebted. was born in Foxboro, Massachusetts, November 17th, 1788, and removed to Newark in 1815. In early life he lived on a farm, but was at the age of fifteen engaged in repairing watches. His first invention was a machine for making wrought nails, in 1812, at the age of twenty-four. In 1813 he invented machines for cutting files, brads, and for cutting and heading tacks. In 1818 he produced the first side of patent leather ever made in this country. important contributions to American industry are too numerous to be enumerated here. He was the pioneer in this country of brads for joiners, of patent leather, of malleable iron, of daguerreotypes, and of locomotives and steam machinery. Through his aid Prof. Morse was enabled to bring the electric telegraph to perfection. After a life of great usefulness, Mr. Boyden died in 1870 at the advanced age of 82 years.

The first census of American manufactures was taken in 1810, when the aggregate value of Newark's yearly product was \$1,210,471. In 1840, 2,403 persons were engaged in carrying on the manufactures of Newark; those in other lines of work numbered 532. From this statement it is seen that the great prominence of the city's manufactures has been the growth of the last fifty years.

As a means of bringing into greater prominence the varied manufactures of the city, the Newark Industrial Exposition was organized in 1872, for the purpose of holding an annual exhibition, made up exclusively of Newark's productions. Thus far the enterprise has met with signal success, and its beneficial results will no doubt annually increase

CELLULOID.

THE CELLULOID MANUFACTURING COMPANY, 45 & 47 Mechanic-st. In many respects the most important industries are those which are the practical results of discoveries whose effects are a material contribution to the industrial progress of a nation, and a means of adding to man's comfort, and thereby supplying the needs of an advancing civilization. No recent industry of this class is deserving of more prominence than the manufacture of celluloid. This new material is produced by a chemical process from cellulose, one of the substances constituting the cellular tissue of plants, being the material which forms the walls or sides of the vegetable cells. Cellulose, united with gum camphor, by a peculiar process, forms the resultant, called celluloid, which is a solid, hard and elastic, having a hardness ranging from horn to that ivory. It is made from cotton, hemp or other fibrous material Its specific gravity is about 1.4.

Celluloid is the result of careful scientific investigations and experiments made a few years since by Messrs. John W. & I. Smith Hyatt, formerly of Albany, N. Y., but now residents of Newark. They are the inventors and patentees. The main patent was granted July 12th, 1870, and several collateral patents have since been issued. Being a new term the word "celluloid" is also patented as a trade mark.

The following are the properties and some of the principal uses of celluloid: It is quite transparent and without the admixture of coloring material it resembles pale amber. But it may be made black or white, or given any hue or tint however rich or delicate. It is elastic and as tough as whalebone. strip may be wound around the finger without breaking, and when released it will quite resume its original shape. Elasticity is a prominent feature, and in this particular it far surpasses ivory. A ball of celluloid having a diameter of two inches, if placed upon an anvil, would withstand a great number of blows from a heavy blacksmith's hammer before being fractured, and if anvil and hammer are polished no indentation will be made upon the ball previous to its breaking. These qualities make it exceedingly useful for purposes requiring toughness and elasticity combined with beauty. Celluloid is a non-conductor of electricity, resembling in this respect hard rubber. On this account its insulating properties are valuable. It is not, however, perceptibly electrical. This characteristic, combined with its toughness, makes celluloid unequalled as a material for the manufacture of combs. The teeth are not easily broken, and the comb does not acquire electricity in using. Elegant brush backs have been made from celluloid. It may be formed into tubes of any diameter and thickness It is not affected in the least by exposure to the atmosphere or to moisture, so that articles made from celluloid and polished, do not lose their brilliancy or beauty, like those made from many other materials.

Doubtless the most remarkable property of celluloid is its change into a plastic state by the application of heat. At a temperature of about 275° it can be moulded with facility into an endless variety of forms for ornament or utility. As a result of this industry, celluloid is in great demand for the manufacture of dental plates. The material is made precisely the natural color of the palate and gums, and its surface is perfectly clean. It is stronger than rubber, and as it does not require to be vulcanized, it can be more easily manipulated. using rubber for artificial teeth, salivation sometimes occurs. Celluloid is entirely free from this danger. Many difficulties have been encountered in the successful application of celluloid to dental plates, but the inventors have been untiring in their efforts, and during the last year have produced an article possessing all the desired requirements. Since then no failures have been reported in the use of celluloid for dental purposes on account of defective material. The opinions of the Dental Cosmos, the foremost dental journal of the country. fully sustains the value of celluloid as a dental base, and many leading dentists add their valuable testimony in its favor. Celluloid has been before the public for dental plates for about three and a half years, and the demand is now becoming general. It is undoubtedly destined to work a revolution in the mechanical processes of dentistry.

The Celluloid Manufacturing Company has been established in Newark about a year. They occupy a new five story factory in Mechanic-street. This company manufactures celluloid in bulk, and in this state it is sold to other manufacturers, who make from it various articles of ornament or use, under privileges granted to them by the company. The machinery in the factory is entirely new, none other being found in the market adapted to the various processes in the manufacture of this novel material. The officers of the company are as follows: Gen. Marshall Lefferts, President; I. S. Hyatt, Vice-President and Secretary; M. C. Lefferts, Treasurer; and J. W. Hyatt, Superintendent. Fifty hands are now employed by the company, and the wages paid weekly are \$400. The present value of the annual product is over \$100,000. As the demand is practically unlimited, and is now rapidly increasing, these figures have no permanent value, the truth being that in another year the product of the Celluloid Company will be double what it is to-day. As an important addition to the manufactures of Newark, hardly too much can be said of the Celluloid Manufacturing Company.

Already factories are in operation and more are constantly appearing for transforming celluloid into articles of use and beauty. The Celluloid Novelty Company is a large concern recently started in Newark for the manufacture of napkin-rings, ladies' necklaces, crosses, lockets, and other ornamental articles. Another prominent concern, also of Newark, is the Celluloid Harness Trimming Company, notice of which may be found in another place.

Penfield & Co., of Philadelphia, are making celluloid truss pads, and truss

springs coated with celluloid. The articles are of a flesh color, the coatings superior to hard rubber, and so elastic that the spring may be bent until it breaks before the covering will rupture. As it is not affected by extreme cold there is no danger of its cracking. The Celluloid Manufacturing Company, whose name heads this article, are now commencing the extensive manufacture of combs, a branch of industry which they purpose making a specialty. The Thayer Manufacturing Jewelry Company, of New York, are making most beautiful articles of jewelry from celluloid which exactly resembles coral, amber, jet, and other costly substances.

Celluloid is no doubt adapted to many uses other than those already discovered; enough is now known, however, to fully establish its great importance in the arts. While celluloid is admirably adapted to take the place of hard rubber in a great many uses, it is particularly valuable in nearly all cases as a substitute for ivory, coral, amber, jet, and all like substances which cannot be formed from rubber. The supply of ivory and the other articles mentioned is annually decreasing, and at the present rapid rate will soon become inadequate. The advent of celluloid, then, as another element in the world's industrial progress, is extremely opportune. In perfecting this useful article, the Messrs. Hyatt are, beyond controversy, public benefactors.

CELLULOID HARNESS TRIMMING COMPANY, 47 Mechanic-street. The success of this establishment clearly shows that through the invention of celluloid a revolution has been brought about in the manufacture of harness trimmings. Heretofore, the material for these various articles has generally been either ivory or hard rubber. The former, however, is becoming scarce, and the latter is in many ways defective as a material for harness trimmings. As a result celluloid is rapidly monopolizing the field. It is now from 30 to 40 per cent. cheaper than ivory, and far stronger. While in its usual state it is white like ivory, it may be colored to suit the fancy. It is susceptible of a higher finish than ivory. Celluloid does not oxydize in contact with metals; hence, its great superiority over hard rubber.

The Celluloid Harness Trimming Company is incorporated under the laws of New Jersey, with a capital of \$100,000. It began business March 1st, 1873. Already its annual productions are valued at \$75,000. The demand, however, for these unrivalled goods, is increasing so fast that the yearly product of the company will soon be doubled. They employ 30 hands, and the wages paid weekly amount to \$350. The officers of the company are Thos. Kays, President; Theo. Morford, Secretary; S. C. Dunn, Treasurer; and O. Wiener, Superintendent.

The Company makes a specialty of martingale rings, colored to suit the purchaser. All the varieties of harness trimmings are beautifully coated with celluloid of any color. By a new and improved method the process of covering

the trimmings has been absolutely perfected. The Company is continually discovering more skillful processes for utilizing the celluloid, inventing improved machinery and increasing the facilities of production. Noticeable among the company's manufuctures are, breeching rings, harness buckles, trace buckles, terrets, bolt hooks, pad hooks, roller buckles, hame rings bridle buckles, and fly terrets. The most beautiful rosettes are those made from celluloid. Their superior merits having become known, the demand for celluloid trimmings is now very great. They are becoming popular over the whole country. The Celluloid Harness Trimming Company are receiving orders from all parts of the country, including Maine and California. The Company sells only to jobbers.

The efficient superintendent, Mr. Wiener, is a member of the well-known firm of Wiener & Co., manufacturers of saddlery hardware. The thorough practical knowledge and executive ability of Mr. Wiener warrant the remark that under his supervision the Celluloid Harness Trimming Company is certain of a prosperous future.

CELLULOID NOVELTY COMPANY, 23 N. J. R. R. Avenue; New York office, 385 Broadway. The above institution is another outgrowth of the introduction of celluloid. They manufacture jewelry, consisting of necklaces, chains, crosses, charms, lockets, &c., in exact imitation of jet, coral, amber, torquoise, and similar articles. Fancy goods in an endless variety, such as belt buckles, napkin rings. paper weights, paper folders, &c., are also made by them.

The Novelty Company began business April 1st, 1874. They are not yet fully organized, the intention being to have the Company incorporated. The number of hands at present employed is 25, the force, however, will soon be doubled. The weekly wages paid amount to \$400. Having recently been started the value of annual production cannot be ascertained, it will, however, be very large. Mr. W. H. Halsey is Superintendent of the company, and his efficient management will greatly contribute to the fullest success of the enterprise.

Although at the outset what were regarded as ample facilities for production were secured, they have now been found inadequate to meet the rapidly increasing orders. Preparations are now being made which will, when completed, provide for supplying the popular demand. The tools used by the Company are a novelty in themselves, and were made specially for this branch of manufacture after original designs. Prominent among the machinery may be named the Hyatt lathe, for turning spheres or any desired shape at a single cut. (An ilustration of the lathe and more extended notice will be found in this work under classification of machinery.) The celluloid is received in bulk ready for use, It is cut with steel cutters into any desired shape, and is then placed in steel dies of exactly the same size and form. The material, after being thus prepared, is subjected to hydraulic pressure, and the various articles, on being

taken from the dies, have the appearance of being elaborately carved. From the dies they are passed to the finishers, who carefully polish the various articles of adornment on buffwheels, the process being similar for the burnish. ing of gold jewelry. Great care is needed in the subjecting of celluloid to these processes. The jewelry and fancy goods produced by the Novelty Company, although rapidly made, are highly finished. An expert is needed to detect the difference between jewelry wrought from celluloid and from the material they represent. This fact is particularly noticeable in the celluloid articles made in representation of coral.

Already the productions of the Celluloid Novelty Company find a market in nearly all the large cities of the Union. They are sold exclusively to the trade.

LEATHER.

AND ITS MANUFACTURES.

Leather, in the light of science, is the skin of animals so modified by chemical means as to become unalterable by the external agents which tend to decompose it in its natural state. The principal agency in producing this chemical change is the application of tannic acid, which exists very largely in nutgalls, and for tanning purposes is mainly taken from the inner bark of trees, the oak and hemlock being the principal sources of supply. The former is considered preferable in the tanning process.

The art of tanning is of great antiquity. The pictorial tablets inscribed on the tombs of ancient Egypt represent the tanner, the currier and the shoemaker, engaged in the various stages of their arts, with the material and utensils of their trades disposed about them. So numerous were the leather makers that a particular locality in ancient Thebis was assigned them. Remnants of Leather, found in Theban tombs, reveal the use of the acacia and other trees in the tanning process.

Leather has been found in the sepulchres of ancient Mexico, indicating a knowledge of leather working among a people coeval with those of the old world, among whom the art was cradled. The Indians of America were familiar with tanning in its primitive stages. Of course their products were inconsiderable, for, having no domestic habits, they could only dress the skins of wild animals. An early historian mentions that the northern Indians converted their skins "into very good leather, making the same plume and soft." Mocca-

sins and leggings were usually made from moose skins. In coloring and pictorial embellishment, the southern Indians appeared to excel. They had, however, no leather manufacture proper, being ignorant of the properties of certain astringent barks and vegetable substances to condense the membranes of the hide, and correct it septic tendency, upon which the whole process of tanning depends.

Columbus is said to have brought the first cattle to America, in 1493. They were brought to Florida in 1565, into Canada by the French in 1608, and the following year they appeared in Virginia. In 1620 a special delegation of tanners was sent to Virginia, when, in 1649, the first attempt was made to manufacture leather by the settlers in America. To promote the industry, tan houses were erected at the public expense, and in 1662 the business had grown to importance. In 1681, laws were passed in Maryland to promote the manufacture of leather. The first New England tannery was erected at Swampscot, in the township of Lynn, in 1646. At this period in New England, the raising of cattle increased so much as to overstock the market, and as a result hides became cheap. Of course this so increased the supply of leather that it was with great difficulty disposed of. As a final result a tremendous impulse was given to the manufacture of shoes, especially in Lynn, whose inhabitants had previously excelled in stock raising. On account of these controlling circumstances, it is not surprising that in twenty years from the settlement of New England, shoes were an important article of export. In 1640, Connecticut passed laws to promote the manufacture of leather. In the colony of New Haven, the industry was prominent, and here the size stick was first used in making shoes. It appears that tanning was introduced in New Jersey about the time of the settlement of Newark, by the people from Connecticut, who laid the foundation of the City of Newark, introduced the process tanning and the various manufactures of leather, which have continually grown and prospered until now Newark is one of the most important leather manufacturing cities in the Union. The industrial records show that the first shoemaker in Newark was named Samuel Whitehead. The first tannery was established in 1698. Before the close of the last century, the leather industry of Newark was of national importance..

The business has steadily grown, until now Newark is among the first cities of the country in the magnitude of its leather manufactures. It is in fact, by many regarded as the foremost city of the world in the production of leather. When one remembers that leather and its manufactures is one of the prominent industries of the world; that it gives employment to as many, or more people than any other branch of industry, it is plain that through leather business alone Newark is brought into the front rank of industrial cities.

Nearly all kinds and grades of leather are produced in Newark, though patent and enameled, harness, trunk and shoe leather are in the foreground. Morocco is also quite prominent. Newark uses oak bark principally in the tanning process. It is easier procured and at the same time more efficacious.

As already mentioned, Seth Boyden was the pioneer in the manufacture of patent and enameled leather in this country. His efforts were first successful in 1818. He is justly regarded as the first man who successfully applied japan in the production of patent leather. It was undoubtedly largely due to the impetus given this branch of leather manufacture, that Newark virtually supplies the whole United States with patent leather, there being only one manufactory outside of Newark. The article is used principally for harness and carriage trimming. The demand for patent leather is constantly increasing, as new industries requiring it are springing up. It is an important article of export from this country, which, however, is not used so much in Europe as here.

GEORGE ALLAN, 91 and 93 Colden-street. Mr. Allan began business in 1853. His goods are sold east and west, but principally to the home trade. He manufactures saddle, harness, trunk and bag leather, and employs five hands, with a weekly pay-roll of \$100. Mr. Allan's productions for 1873 were valued at \$30,000.

COGAN & REILLY, Avenue C and Murray-street. This firm was established in 1870, and now employs eighteen hands, the weekly pay-roll being \$200. The annual productions are valued at \$40,000, and consist exclusively of patent and enameled leather. The goods are sold in the home market and mainly to jobbers.

- J. F. COBURN, Magazine and Frankfort streets. This manufactory was established in 1864. The working force at present employed numbers twelve hands, and their weekly wages are \$150. The value of the annual production is \$50,000, and they consist of patent and enameled leather. The goods are sold to jobbers, and principally find a market in New York and Philadelphia.
- J. H. & T. W. DAWSON & CO., Ferry and Madison streets. The above firm was established a quarter of a century ago, and can be classed as among the pioneer establishments of Newark in the manufacture of leather. At the commencement of business the firm used about one hundred hides per week. They now, however, manufacture double that number per day, employing at the present time 150 hands, with a weekly pay-roll of \$2,000, or an average of \$100,000 per year. The amount of annual productions could not be obtained, the firm refusing the necessary information; but from a careful estimate, based upon the number of hides used and their market value, it cannot be less than \$375,000, and has been so tigured in the summary of this branch of industry. The reason of the firm for refusing the desired information could not have been that their productions are of no small importance, as the Messrs. Dawson are doing an extensive trade. The well-known superior quality of their goods is

conceded by all dealers in leather, and their productions are sold in all the principal cities of the United States, and are largely exported to Europe. The firm manufacture every variety of patent and enameled leather, calf skin, etc.. including leather for the trade in all branches. A specialty is made of enameled hides and wax splits.

WILLIAM DUNN, 256 Passaic-street. Among the older manufacturers in leather may be named Mr. Dunn, who was established in 1845. When quite a young man he started the manufacture of patent and enameled leather with a small capital. Through persistent energy, a strict attention to business and honorable dealing, Mr. Dunn now ranks among the principal producers of Newark. He at present employs 50 hands, whose weekly wages amount to \$700. The productions of this factory for 1873 were valued at \$130,000, and sold principally to the trade through the east and west.

SAMUEL DUNN, 15 to 23 New York Avenue. This manufacturer was established in 1859. His productions consist of every variety of fancy skins, prominent among which may be named calf and sheep, kid roans, skivers, &c. Mr. Dunn employs constantly 25 hands, with a weekly pay-foll of \$350. His productions for 1873 amounted to \$20,000. The goods are largely sold direct to the consumers.

JOHN DWYER, 76 Market-street. The principal productions of this manufacturer embrace trunk splits, bridle, harness and bag leather. Mr. Dwyer established his present business in 1865. since which time his sales have steadily increased, last year amounting to \$110,000. He employs 35 hands, with a weekly pay-roll of \$500, and sells almost exclusively to consumers, his principal markets being Newark and New York.

EBENEZER FRANCIS & CO., Oliver-street. This firm manufactures exclusively patent and enameled leather, and was established in 1842. They employ at present 25 hands, but usually give employment to double that number. Their productions are sold to both jobbers and consumers, and were valued at \$105,000 for 1873. The amount of weekly wages paid to hands is \$400. This firm is one of the oldest in Newark, in the manufacture of patent and enameled leather. Indeed, perhaps no other firm in Newark can date their establishment as far back as can Messrs. Francis & Company. Their goods are favorably known to the trade throughout the United States.

T. P. HOWELL & CO., New, Wilsey and Nuttman streets. Prominent among the manufacturers of patent and enameled leather is the above firm. They began business about 1845. A history of the company would be almost a continuous narrative of the leather interest of Newark. The buildings now occupied by this firm in carrying on the various tanning processes, which result in the finest products of the art, cover nearly five acres of ground, and extend in

one directions 2,200 feet. There are used each year 40,000 hides, 150,000 sheep skins, 10,000 deer skins and 10,000 calf skins. They manufacture all kinds of patent and enameled leather, bridle leather, sheep skin skivers, roans, harness leather, buck and chamois, wax, calf and oil tanned leather; also, fancy sheep skin mats. These various products find a market in all parts of the country, and are largely exported to the West Indies, South America and Europe. The hides used by Howell & Company are from their own slaughtering, an unusual feature of the leather industry. They employ 450 hands, with a weekly pay-roll of \$3,000. Their annual productions are valued at \$1,000,000. The salesroom of the firm is at 77 Beekman-street, New York.

C. H. & J. D. HARRISON, New York Avenue, near Railroad Avenue. This firm was established in 1849 in a modest way by Chas. H. Harrison, the first year's production being \$15,000. In 1851 Mr. John D. Harrison purchased an interest in the business, and since that time the firm, C. H. & J. D. Harrison, manufacturers of patent and enameled leather, has been closely identified with the interest of Newark. At present they are among the solid institutions of the city.

Their working force numbers 91 hands, and the amount of wages paid weekly is \$1,500. The value of productions for 1873 was \$393,000. They used last year 15,000 hides. The firm manufacture all kinds of patent and enameled leather, but their specialty is carriage and harness makers' supplies. The trade of this firm extends both to jobbers and consumers.

While caring for the firm's extended business Mr. J. D. Harrison has found time for filling with fidelity and honor several offices of public trust. At present he is a prominent member of the City Council and a director of Newark's Industrial Institute.

- J. F. HESSELBARTH, 36 Garden-street. This manufactory was established 1862, and its business is mainly confined to tanning. Six men are employed in and their weekly wages amount to \$70. The yearly product is valued at \$28,000. The goods are sold to jobbers and consumers, and mainly in the home market.
- M. HARTEL, 361 Halsey-street. This modest concern was established in 1849. The only products are carriage and bag leather, which are sold to New York jobbers. Four hands are employed, the wages being \$75. The annual productions are valued at \$30,000.
- J. H. HALSEY & CO., 185 Washington-street. This firm manufactures some kind of leather. They refuse, however, for reasons best known to themselves, to give any information in regard to the nature and extent of their business.

HENRY LANG, 195 to 199 Plane-street. This concern was established five

years ago. Forty hands are employed with a weekly pay roll of \$600; the annual productions being \$170,000, consisting of trunk, bag, shoe, harness and bridle leather; a specialty is made of fancy colored leather for pocket-books and ladies' traveling bags. Products are mainly sold in the home market.

LOEHNBERG & NEWMANN, 292 Norfolk-street This firm is engaged in the manufacture of leather for trunks, inner-soles and shoe splits, which is mainly sold to the consumer in the New York and Eastern markets. The firm employ ten hands, paying them weekly \$150. They were established in 1867 and the value of their first year's productions was about \$5,000. The business has, however, steadily increased until their products have now an annual value of \$20,000.

MANDEVILLE & PREST, 60 Market-street. The above firm, under its present style, has only been established since 1872, although both the partners have been engaged in the manufacture of leather for many years. There are ten hands employed whose wages amount to \$125 per week. The productions of 1873 were valued at \$50,000. Among the various goods manufactured by this firm may be named harness, bridle, shoe and bag leather, all of which are sold direct to the consumer, no goods being sold to jobbers.

MEIS & CO., Seventeenth Avenue, and Lillie-street. This firm does a general business of tanning and currying, and also manufactures bag, russet and trunk leather. They were established in 1867. The present annual production amounts to \$60,000. The number of men employed is twenty, and their weekly wages are \$200. The productions of Meis & Co. are mainly sold to consumers in the home market.

McCLATCHEY, REILLY & SMITH, Corner Sussex Avenue, First and Second streets. The above firm, although established in 1870, have already built up a trade which extends to all the principal cities in the United States, and will compare favorably with many manufacturers of longer standing. Their productions for 1873 were valued at \$200,000. This showing speaks well for the quality of their manufactures, which consists of Patent and Enameled leather. The firm employs 50 hands, whose weekly wages amount to \$700.

PALMER & SMITH, 67 Hamilton-street. This well-known manufactory was established by Mr. T. G. Palmer, in 1855. In 1861 Mr. Smith purchased an interest in the firm, from which time down to the beginning of 1873, the business was conducted at 70 Market-street. At the latter date they removed to their new and commodious factory then completed. This building, which they now occupy, is located at 67 Hamilton-street. It 142 by 30 feet, five stories in height, and furnished with all machinery necessary for their extended business. It is heated by steam throughout, and is conveniently arranged, having been built expressly for the leather manufacture. Formerly their productions

consisted chiefly of the varieties of leather used by trunk makers. Of late, their business has been so extended as to include leather supplies for all manufacturers requiring the article named. The variety of their productions, therefore is very extended. One manufacturer requires a special brand of colored leather for fancy cigar cases, another orders a hundred sides for ladies' belts, while a pump maker wants only one for valves. Thus, this firm, unlike their co-workers, supplies a demand as varied as there are different manufacturers requiring leather in their operations. In addition, Messrs. Palmer & Smith have won a reputation for their abilty to produce, in short notice, any special brand of leather for use in the process of any new industry. Harness and saddle makers, trunk and bag makers, and the manufacturers of shoes are their main patrons. The brands of Harness and bridle leather made by Palmer & Smith have no superior. During the last two years, the demand for fancy colored leather has so increased that the market is with difficulty supplied, owing mainly to an inadequate supply of perfect leather for finishing. To meet this want, Palmer & Smith have all the selected leather from three tanneries, and employ in the finishing process, about 25 hands. In addition to their factory already mentioned, this firm carries on a special branch of manufacture in another building. Here the waste and trimmings of the main factory are worked up into soles for women's shoes, and leather backs of horse brushes, forming, of itself, a fair trade.

Palmer & Smith employ 40 hands, and the weekly wages amount to \$600. Their product of manufactured goods for 1873 was valued at \$178,000. Their trade extends from Maine to Louisiana in the south, and California in the west It is only necessary to add that Messrs. Palmer & Smith, as manufacturers of enterprise and skill, have done much to extend and build up Newark's industries, of which their factory is an important feature.

JOHN H. PERRY, South Orange Avenue, Richmond and Norfolk streets. Mr. Perry began business in 1862, and now employs 100 hands, with a weekly pay roll of \$800. The yearly product of the factory is valued at \$180,000 Its productions are patent and enameled leather, dull and polished grain, bag leather and shoe splits. Mr. Perry's specialty is the well and favorably known "Ox Brand" of patent and enameled leather. It is largely sold to the most prominent jobbing houses in the country. The merits of the "Ox Brand" are everywhere acknowledged, and great exertions are required to supply the demand. This popular brand is sold in all parts of the country, and is largely exported to England and France. Mr. Perry deserves great credit for the skill and energy he has displayed in thus perfecting the processes of leather manufacture. He has, no doubt, contributed greatly to the reputation of Newark as a leather producing city

REWNOLDS & WOOD, 25 to 48 Spring-street. This is among the oldest manufactories of patent and enameled leather in Newark. It was established in 1836 by Mr. Richmond Ward, who was a pioneer in the patent leather industry of America. He was an associate and cotemporary of Seth Boyden. Under the directions of Mr. Ward the business grew and prospered, the result being that the firm of R. Ward & Company was known for years as a leading house in producing the best qualities of patent and enameled leather. Mr. Ward died in 1872, and since then the firm name has been changed as above.

The buildings necessary for carrying on the present business of the firm are very extensive, and are furnished with all modern improvements requisite for the most skillful processes of manufacturing. At present 80 hands are employed, their weekly wages amounting to \$1,000. Only the largest and best hides are used, and the facilities are provided in this immense establishment for tanning and finishing 500 hides per week or 25,000 per year, thus giving an annual production of \$500,000. All kinds of patent and enameled leather are manufactured, the principal grades of the former being winker, bridle and skirting. Special attention is given to the production of a superior quality of colored enameled leather. The most brilliant and beautiful colors are produced, and from 25 to 30 different shades are kept in stock

Messrs. Reynolds & Wood employ no traveling salesmen and have no branch house in New York. The high quality of their productions is so well known, that these artificial methods of effecting sales are not needed. They manufacture principally for jobbers, and their trade extends over the whole country. They also export largely to South America and Europe.

STAR LEATHER WORKS, Montier & White, proprietors, 295 Ferry-street. A notable feature of Newark's industries is their inter-dependence. They are so diversified that what would otherwise be the refuse matter of one factory, forms the raw material for another. The percentage of waste is thus reduced to the minimum, thereby insuring a maximum of profit. Until recently the splits, shavings and clippings of leather factories have been valueless. Now, by means of a French chemical process, they are combined and transformed into a substance similar to sole leather, for use in manufacturing the insoles and heels of boots and shoes. The article is prepared in sheets, $10\frac{1}{2} \times 22$ inches, one-fourth inch thick. It is cheaper and quite as durable as leather in its original form.

The above factory was established in 1871, and is the only one in this country for utilizing the waste matter named. The present working force numbers 80 hands, and they are paid weekly \$450. The annual productions of the factory are valued at \$70,000. The leather thus prepared is readily sold to the manufacturers of the Eastern and Middle States.

GEORGE STENGEL, 325 Academy-street. This manufactory was estab-

lished by Christian Stengel in 1854, and has been succeeded in the business by his son, as indicated above. Fifty hands are employed, with a weekly pay-roll of \$800. Mr. Stengel manufactures exclusively patent and enameled leather, the value of his yearly product being \$160,000. A specialty is the "Horse Brand," whose superiority is acknowledged by the trade. These goods are sold exclusively to jobbers, and find a market principally in Philadelphia, Wilmington and Cincinnati.

CHAS. SMYTH, 248 Central Avenue. This manufactory has been running since 1860. Ten hands are employed, with a weekly pay roll of \$150. The value of the annual productions are \$40,000. The principal brands of manufacture are harness, bridle and skirting, shoe, bag and trunk leather. These goods are sold in the home market and in New York, and exclusively to consumers.

JAMES STANFORD, 361 Mulberry-street. This manufactory was established in 1869, and now employs five hands, with a weekly pay roll of \$100. The annual productions are valued at \$10,000, and consist of fancy stock for pocket-books, bags, book-binders, etc., their market being principally in New York.

Mr. Stanford, in addition to his leather business, has a patent dye stuff for light woods and veneering. Any color is produced, and ashburr is dyed to closely resemble imported amboyne.

M. STRAUS, 39 and 41 Vesey-street. The manufacturer of patent and enameled leather was begun by Mr. Straus in 1865. He is at present employing 20 hands, with a weekly pay roll of \$350. During the year 1873 the number of hides used was 8,000, and the total value of products was \$120,000, which were mostly sold to home and near-by trade, including New York, Boston and Philadelphia. Bag, russet, trunk and belt leather are also extensively manufactured—a specialty being belt leather.

SMITH & CARR BROTHERS, 101 and 103 Barclay-street. The business of this firm is confined to tanning. They employ four hands, the wages paid weekly amounting to \$60. The annual product is valued at \$40,000, and is all sold to the home trade.

HUGH SMITH, Hoyt-street and Central Avenue. This manufactory was established in 1862 and gives employment to 20 men, with a weekly pay roll of \$200. The productions consist principally of shoe and bag leather, the annual value of which is \$75,000; the products being mainly sold to consumers in the New York and home markets. Mr. Smith is also extensively engaged in finishing leather for the trade, which business added to his manufactures would make the handsome showing of annual trade done to be near \$150,000.

ABRAHAM TRIER & BROTHER, East Kinney and McWhorter-streets. This firm manufacture trunk and shoe leather in the rough, and commenced business in 1864. They now employ 10 hands, to whom are paid \$150 weekly. The productions of the firm for 1873 were valued at \$60,000.

H. L. WILDE, 60 Market-street. The amount of business done by Mr. Wilde in 1873 is by no means a fair comparison, as he was compelled by illness to suspend operations for several months. He was established in 1860 as a member of the firm of Finley & Wilde, and at the death of Mr. Findley succeeded the firm. Mr. Wilde at present employs seven hands, whose weekly wages amount to \$100. His production for 1873 was valued at 50,000, and consisted of shoe, harness and trunk leather. His goods are now sold principally to home and near-by trade.

BLANCHARD, BROTHER & LANE, 20 to 38 Bruen-street. For purely personal reasons the members of this firm declined to furnish the desired information concerning their methods of manufacture, and amount of productions. On account of their well-known prominence in the leather industry of Newark, careful inquiries have been made as to the nature and extent of their business, and the following facts and figures may be regarded as accurate, having been derived from trustworthy sources of information.

Mr. N. F. Blanchard, senior member of the above firm, is one of the oldest men in the patent leather trade, having been identified with the business for 37 years, filling the several positions of apprentice, journeyman, foreman, and partner. After years of patient toil, he is now regarded as one of the most practical leather manufacturers in the country. In 1861 Mr. Blanchard founded the house which is now known under the above style. His efforts were immediately successful and the business rapidly increased. A few years later Mr. F. S. Blanchard and P. Van Zandt Lane became his associates in business, from which time the firm, as then organized, has met with continuous prosperity. Following the plan of the original founder, only the finest grades of patent leather are made. The firm has gained an enviable reputation for careful selection of stock and the best processes of manufacture. They are a live firm. Each member has his separate duties to perform. The Messrs. Blanchard are thoroughly practical, and each piece of patent leather made passes through their hands for inspection.

The products of the firm are exclusively confined to patent leather, a specialty being the celebrated "Buffalo" brand. A greater variety is produced than by any other firm. The various wants of the trade receive careful attention. The several buildings necessary for carrying on their immense business cover an area of one and a half blocks. While not behind in production, they are the youngest house in this line. As an illustration of the great producing facilities, \$25,000 worth of bark is constantly kept in store. The facts relating to the firm's business, including the number of hands employed, etc., are included in the general summary. The value of annual production,

however, as derived from the most trustworthy sources, cannot be less than three-quarters of a million dollars, thus making Messrs. Blanchard Brother & Lane, the largest manufacturers of patent leather in the world.

S. HALSEY & SON, Shipman and Market streets. This well-known house has perhaps been as closely identified with the continuous growth and prosperity of the patent leather industry of Newark as any other firm. In fact many of the incidents relating to it possess an historic interest. One in particular is worthy of mention. It was in a room of the present factory that Mr. Seth Boyden succeeded in making the first side of japanned, or patent leather ever produced in America. Considering the present great importance of this industry, the locality named possesses at least a part of the interest which might cluster around the room wherein Watt invented the steam engine, or even the building, if that were known, in which the original process of tanning was discovered.

The above firm was established in the early part of the present century. In 1849, the style of Halsey and Tucker was adopted. The present firm name dates from 1866, when Mr. Geo. A. Halsey became a partner. The senior member, Mr. Samuel Halsey, by his intimate knowledge of the best manufacturing processes, careful business habits, and personal integrity, has greatly contributed to the prosperity and fair fame of Newark. In his declining years he has the satisfaction of looking back on a life of usefulness and honor.

The present working force of the factory numbers 100 men. The wages paid amount each week to \$1,800. The aggregate value of yearly production is \$450,000. The goods produced consist almost entirely of patent leather, for carriage and shoe purposes, and their high quality is well known to the trade. Sales are made in all parts of the country, and the export demand is very extensive.

RUSSIA LEATHER MANUFACTORY.

AMERICAN RUSSIA LEATHER MANUFACTURING COMPANY, Hoyt and Bleecker streets; Salesrooms, 51 and 53 Maiden Lane, New York. Gradually but surely American manufacturers, through their inventive genius, energy and enterprise, are surmounting all obstacles, and more nearly supplying the home market, thus shutting out the foreign producer. In many branches of industry, the growth has been so rapid as to make this desired result complete, and in some instances a foreign demand has been created in the opposite direction.

An industry heretofore monopolized by foreign countries has been the production of what is known as Russia Leather. This article has mainly come from the country whose name it bears. It is a variety of variously colored fancy leather, whose distinguishing characteristics is a peculiar odor, imparted to it from certain chemicals used in dying. The singular and not unpleasant smell thus received is said to give greater durability, and complete freedom from the ravages of insects. Principally for these reasons it is in great demand for book binding, the manufacture of pocket books, &c. The result has been that the price of Russia leather has ruled high, and the articles made from it have been very expensive.

As its name indicates, the object of the above company is the production of Russia leather. It was established in July of the present year, and is therefore an innovation. American skill, however, is triumphant, and its success is assured. The products of this factory, the only one of its kind in this country, are in no way inferior to the foreign article; not an imitation, but the genuine "Russia." It is already beyond controversy that the productions of the above named company are in successful competition with imported goods. Two causes contribute to this result: (1) the admitted genuineness and high quality, and (2) the reduced price as compared with the leather brought from Russia.

The American Russia Leather Manufacturing Company is incorporated under the laws of New Jersey, with a capital of \$10,000. Mr. F. A. Carpenter is president of the company, and C. L. Parker, secretary. The present working force numbers twelve men, and their weekly wages are \$200. The value of annual productions cannot now, of course, be accurately determined, but from present indications will be very large. The facilities for manufacturing are now being greatly increased. The goods are sold wholly to jobbers, and readily find a market in all the principal cities of the Union.

MOROCCO MANUFACTORIES.

Morocco leather is goat skin tanned, and then dyed on the side of the grain. It was not made in this country until after the revolution. The first effort at manufacture was made in Philadelphia, which city is now at the head of this industry in the aggregate value of its annual product. Newark is next in importance. The latter city, however, has the largest single manufactory. Morocco is exported to South America and the West Indies. The goat skins are imported from India, and in general from barbarous countries. Morocco is principally used in the manufacture of ladies fine shoes.

JAMES S. BARCLAY, 215 Plane-street. This manufactory was established in 1869, and at the present time employs 30 hands, whose weekly wages amount to \$450. The value of the productions for 1873 was \$100,000, and consisted of colored morocco for shoes, book binders, bags, furniture, etc. In addition to Morocco, Mr. Barclay is also extensively engaged in the manufacture of calf-kid and sheep skins. His goods are sold both to the jobber and consumer.

GEORGE DOUGHERTY, 265 Washington-street. Mr. Dougherty began the manufacture of morocco in Newark in 1834. He was the pioneer of this industry in the State of New Jersey. Several had previously attempted it, but only failure was the result. From his successful efforts the Morocco industry of Newark dates its growth. Several of the leading morocco manufacturers of Newark served their apprenticeship with Mr. Dougherty. The morocco manufacture as an important industry of Newark, is greatly indebted to his rare skill and energy. In his present factory he turns out 240 finished goat skins per day. He employs 40 hands, paying them \$600 weekly. The value of productions for 1873 was \$150,000. Had Mr. Dougherty not met with unforeseen reverses, he would perhaps now be the leading morocco manufacturer of the world. He is now 71 years of age, and his long life of great usefulness is adorned with a sterling integrity which knew no compromise with injustice and wrong.

GORMAN, FORREST & CO., 425 Market-street. This firm are engaged in the manufacture of morocco exclusively for ladies' shoes, which they sell extensively to the New York and New England markets. A large portion of their products are, however, consumed by home trade. The firm employs 34 hands, whose weekly wages amount to \$500. The value of the factory's productions for 1873 was \$150,000.

KELLY & HUGHES, 72 Market-street. This firm is well and favorably known to the trade, having been in the business since 1859. In 1871 the firm of Kelly, Hughes & Moran was organized, but by the recent decease of Mr. Moran the firm has again been remodeled and assumes its present style. They employ 50 hands, with a weekly pay-roll of \$700. For the year 1873 the market value of their productions was \$175,000. Their principal manufacture is morocco, which is sold direct to the consumer. The firm make a specialty of Tampico and Curacoa stock.

C. NUGENT & CO., 195 and 197 Halsey-street, This immense establishment was founded 1859. The members of the present firm are Messrs. C. and J. Nugent. Their factory is in the rear of the office on Halsey-street, extending from 1 to 17 on Camfield Court, a distance of 600 feet, including a new structure, 60 x 80 feet, and five stories high, now building. In the high quality, and aggregate value of annual productions, this is the largest morocco factory in the world. Its present great prominence is the legitimate outgrowth of the indus-

trial skill, persevering energy and careful business habits of the Messrs. Nugent. To their marked ability and genuine enterprise the morocco industry of America is greatly indebted.

The products of this manufactory are the finest qualities of Morocco, calf and French kid. There are used each week in the various tanning processes, 18,000 goat and 2,000 calf skins. The number of hands employed is 400, and their weekly wages are \$4,000. The value of annual productions reaches the enormous sum of \$1,500,000. These goods are sold in all parts of the country, from Maine to California, and are largely exported to Europe. Owing to their great capital, vast amount of productions and extensive trade connections, the firm of C. Nugent & Co. occupy no second place in controlling the morocco market. Their salesroom is at 69 Gold-street, New York.

JOHN YOUNG & SON, 66 Market-street. This firm was established in 1838 by John Young. In 1854, his son, Chas. E. Young, became a member, when the present firm name was adopted. Since then and following the death of the elder Mr. Young, the business has been conducted under the same title. Under the direction of Mr. Chas. E. Young it is now one of Newark's representative morocco manufactories. The high quality of its productions is everywhere acknowledged.

The hands employed number 50, and their weekly wages are \$800. The value of the annual production reaches \$200,000. The cheaper qualities or imitations of Morocco, are not manufactured; only goat skins are tanned and finished. These goods are sold both to jobbers and consumers, and find a market mainly in the eastern seaboard cities, though extensive sales are made in the west.

Mr. Chas E. Young is President of the Newark Board of Trade, and in the belief that the prosperity of Newark is the interest of every manufacturer, he has long been prominently associated with all movements for properly placing before the country the importance of Newark as a manufacturing city, and an inviting field for the investment of capital.

SADDLERY AND HARNESS MANUFACTORIES.

Early in the present century Newark became prominent in the manufacture of saddlery and harness. And it has since been recognized as the first city in the Union as regards the quality and aggregate value of productions in this important branch of industry. In its workshops are made every variety of saddles and harness which modern taste requires, and these wares find a market in all

parts of the civilized world. South American wants and requirements are supplied quite as readily as those of more northern climes.

In this connection an important change is noted. Since the war the demand for saddles has materially decreased. Previously the Southern States were very liberal buyers, but the custom of horse-back riding, then so prevalent, seems now to have become in equal measure obsolete, existing mainly as a relic of the slavery era in Southern history.

E. F. BECK, 104 N. J. R. R. Avenue. Mr. Beck began the manufacture of harness in 1864, and through careful business habits and an intimate knowledge of trade requirements his business has constantly grown and prospered. The products of his factory consist of the finest grades of harness, including winkers, fronts, pad-cloths, etc. These extra fine goods are sold exclusively to the wholesale trade, and find a market in the Eastern and Western States, including California. Forty hands are given employment, and wages to the amount of \$500 are paid weekly. The yearly productions are valued at \$65,000. Mr. Beck's assiduous attention to the wants of his customers is an important element in building up his extended trade.

BUTLER & WARDS, 44 Mechanic-street. The productions of this firm are known as patent leather work for harness, consisting of harness blinds, rosettes, pad heusings, bridle fronts, hand parts, etc. This house is the only one in Newark engaged in the same line of production. The new and ingenious designs they are continually producing are sufficient evidence of the firm's energy and enterprise. These unrivalled goods are sold in all parts of the United States and Canada, extensive sales being made on the Pacific coast. The present annual production amounts to \$120,000, and is rapidly increasing. Sixty hands are employed and the weekly pay is \$700. The members of the firm are Messrs. Francis C. Butler and Eugene and Elias S. Ward.

T. BENEDICT, 869 Broad-street. Mr. Benedict was established in 1836 and may therefore properly be classed as among the oldest harness manufacturers in the City of Newark. Until recently he was extensively engaged in the wholesale trade, but at present manufactures a fine quality of harness exclusively for custom trade. His productions are mostly sold in the home market and their annual value is \$25,000. He employs 15 hands, paying them \$250 weekly. Mr. Benedict makes a specialty of interfering boots for horses; having given the subject careful consideration for many years. He now manufactures over 50 different kinds, all of his own invention.

S. A. CONDICT & CO., 261 and 263 Market-street; New York office, 521 Broadway. This well known house was established in 1832, under the firm name of Jacobus & Condict. It is thus one of the oldest saddlery and harness manufactories in Newark. The present style was adopted in November, 1873,

and the firm now consists of Messrs. S. H. and S. A. Condict and S. W. Patton. Mr. S. A. Condict has been identified with the business from its inception.

The firm's productions comprise every variety of saddlery and harness known to the trade, from a highly-finished carriage harness or lady's riding saddle to the coarse harness for plantation use, or the plainly-finished and more durable saddle for the South American market. It is hardly necessary to mention the extra quality of materials used in the various processes of manufacture, the long standing of the house and the acknowledged high reputation of the goods is sufficient evidence. Their continued uprightness and fair dealing have added much to the renown of Newark as a great centre of industrial skill. The goods find a market throughout the country and are largely exported to all parts of the civilized world. Sales are made exclusively to jobbers. The working force of the firm numbers 100 hands, and the weekly pay roll amounts to \$1,300. The aggregate value of yearly productions is about \$300,000, and is constantly increasing with the growing demand for the firm's superior goods.

- E. A. CROSSMAN, JR., 23 Railroad Place, Wheaton Block. This house manufactures harness exclusively, and a specialty is made of the finer grades, comprising road, coach and track harness. The manufactory has been established for many years, and has been conducted under the above style since 1868. The working force numbers 15 men, and the weekly pay roll amounts to \$200. The yearly product of harness is valued at \$20,000. The goods are mainly sold in the eastern markets.
- J. CLEMENTS & BROTHER, 294 Market-street. This firm makes a specialty of fine riding bridles and martingales, in various styles and colors; also varieties of fancy articles, such as cigar, match and spectacle cases. The products are sold to the jobbing trade in all the principal cities. The operatives are mostly women, and at present 8 are employed, the weekly wages being \$40. The value of yearly productions is \$9,000.
- N. J. DEMAREST & CO., 10, 12 and 14 Division Place. A marked peculiarity of Newark's manufactures is their unsurpassed quality and finish. In the various lines of production no "shoddy" goods are made. Unrivalled excellence is the first cause of the success and prosperity attending the earnest efforts of the leaders in the city's industries

No single firm, by its methods and processes of manufacture, more clearly confirms these statements than the one named above. This harness manufactory was established in 1827, by Mr. Daniel Demarest, the father of the present senior partner. Mr. N. J. Demarest assumed control of the business in 1865, from which time until 1871, successive changes in the firm occurred. At the latter date the present firm name was adopted. At present Mr. Demarest's sole associate in business is Mr. L. J. Keefe.

Messrs. Demarest & Co. manufacture harness exclusively, and their work is

mainly confined to the more costly varieties. The firm's productions are everywhere acknowledged as unexcelled in quality of material and skillful workmanship. Machinery is used very little in manufacture, as the product of machine sewing is necessarily inferior. So celebrated has the Demarest harness become, that other manufacturers, unable to produce its equal, are obliged to order from Demarest & Co., to supply the wants of their customers. The several brands of harness are numbered from 1 to 70, thus facilitating the giving of orders, as on this account an exact duplicate of any set of harness can be immediately furnished. While excelling in quality this firm is not behind in amount of productions. They frequently make 200 sets of costly harness per week. During the late Franco-Prussian war they filled some immense contracts for the French government, on one occasion making 4,000 sets of artillery harness in eleven working days. At present the firm employs 100 men, and the weekly wages are \$2,000. The value of annual production reaches \$175,000. The market for these superb goods is not confined to the United States, but extends to Europe, the Indies, Australia and Japan, including the Sandwich Islands and South America.

Owing to the increasing demand for their productions, Messrs. Demarest & Co., are now perfecting plans for a new and larger factory at 247 Market-street. The building will be of brick, 27 x 80 feet in size and 4 stories high. It will be constructed with special reference to convenient arrangement and greater manufacturing facilities, working room being provided for 175 men. The total cost, inclusive of ground will be about \$40,000.

An important element in the growth of the firm's business has been the sterling worth and integrity of the senior member, Mr. N. J. Demarest.

THEODORE DUFFORD, 260 Market-street. This manufactory was established 20 years ago, by John J. Davey, and for several years was carried on under the firm name of Denton & Davey. During which time the present proprietor was employed as Manager, and upon Mr. Denton's retiring from business became a partner and has since become sole proprietor. Mr. Dufford manufactures exclusively fine carriage harness for the custom trade, and numbers among his customers the merchant prince of New York, Mr. A. T. Stewart, who orders from this manufactory all the harness requisite for business purposes and his private use.

Mr. Dufford employs 12 hands, paying them weekly \$200. His annual productions are valued at \$25,000. The products of this manufactory are sold mostly to home and near-by trade.

JOSEPH DAVEY, 256 Market-street. The first attempt in Newark to manufacture harness exclusively was by Mr. Joseph Davey. He saw the necessity of a more diversified industry. The enterprise was successful, and resulted in the establishment of similar manufactories, several of which have

since grown to great prominence in the production of all varieties and grades of harness.

The working force of Mr. Davey's factory numbers 40 hands, and the weekly pay roll is \$500. The yearly product is valued at \$75,000. The goods are sold mainly to the home trade, and comprise all kinds of harness, including pads and gig saddles.

JOHN HOUCK, 33 Court-street. The productions of this manufacturer consist of medium harness and gig saddles. He employs three hands, paying them weekly \$50. The value of the annual products is \$5,000, which are sold exclusively to jobbers in the New York market.

MANNING & LYON, 24 and 26 Mechanic-street. This manufactory was originally established as the Eagle Winker Company, the above firm succeeding them in February, 1874. It is the only factory in Newark making horse blinds exclusively. Fine work is a specialty, and the Eagle Winker has an enviable reputation for extra quality and finish. Nine hands are employed, and the weekly pay roll amounts to \$100 At present the annual productions amount to \$25,000. Mr. Robert Manning the head of the firm, has been identified with the Eagle Winker Company from its inception, and the prominent position the "Eagle Winker" now occupies in the harness market is to be attributed solely to his perseverance and the excellent quality of the goods.

TOMPKINS & MANDEVILLE, 323 Market-street. This well and favorably known manufactory was originally established in 1857 by Mr. Wm. Kinsey. In 1864 Mr. W. L. Tompkins, who for many years had filled the responsible position of superintendent for Mr. Kinsey, was admitted as a member of the firm, and a few years later, upon Mr. Kinsey's retiring from business, Mr. Tompkins became the head of the firm he had so long been identified with, and which is now one of Newark's representative manufactories.

The firm as at present organized, dates from 1871, and employs 100 hands, whose weekly wages are \$1,300. They manufacture every kind of harness, all of which is made from the best quality of oak-tanned leather, carefully selected for the purpose. The senior member of the firm, Mr. W. L. Tompkins, from long experience is thoroughly practical, and personally directs the entire business. The value of their yearly productions is \$120,000. Their products are sold principally to jobbers, and the trade of the firm extends over the whole country, large amounts being sold in the Eastern seaboard cities. All the goods manufactured by this firm are of superior quality, and above the average, being of such a character as to command a speedy sale and give universal satisfaction.

ALFRED F. MUNN, 314 Market-street. This house was first established in 1822 under the firm name of Smith & Wright. After various successive

changes Mr. Alfred F. Munn has now become the sole proprietor. Mr. Munn manufactures all varieties of harness, making a specialty of the finest grades. Saddles also are produced, including saddlery goods in general. Seventy-five hands are employed, and their weekly wages amount to \$1,000. The annual production reaches \$200,000. These goods are mainly sold to the home trade, though extensive sales are made in New York and Philadelphia.

PETERS & CALHOUN COMPANY, Nos. 906 and 908 Broad-street; salesroom, No. 33 Mercer, one door below Grand-street, New York. the growth of this manufactory would be to follow the rise and progress of the saddlery and harness industry of Newark. It was established about 45 years ago under the firm name of Shugard & Macknett. Mr. George Peters, of the present company, was in their employ, and became their successor in the business, which was afterwards continued under the style of Peters & Benner. The latter gentleman withdrew in 1863 and since then Mr. Peters was sole proprietor until the present year, when a company was organized, as indicated above. The Peters & Calhoun Company is to-day the largest saddlery and harness manufactory in the country, if not in the world Two hundred hands are employed, and their weekly pay roll is \$2,000. The value of the annual production is usually about \$250,000, but this year will be fully \$300,000. The products comprise every known variety of saddlery and harness. Over 250 different styles of the former are made. Their trade extends over the whole country, but is principally in the East and South. To supply the latter all kinds of plantation harness are made. This firm, more than any other, monopolizes the Southern trade. Sales are made wholly to jobbers. Mr. George Peters, as the head of this immense establishment is widely and favorably known, and his name has become synonymous with the highest results of manufacturing skill and enterprise. The five-story factory of the company fronts on Broad-street and is one of the most attractive buildings in that busy thoroughfare.

GEORGE ROUBAUD, 202 Market-street. At this manufactory the productions comprise all kinds of fine and medium harness, which is mostly sold to the home trade. Mr. Roubaud employs five hands, paying them \$70 weekly. The value of annual products is \$11,000. This amount is exclusive of the large sales of horse furnishing goods and equipments.

HARNESS MAKERS' CO-OPERATIVE UNION, 217 Halsey-street. This manufactory was established in January of the present year, and is the first attempt in Newark at co-operative industry in this branch of manufacture. Harness of all kinds, gig saddles, pads, etc., are made; the specialty, however, is a medium grade of harness. The present working force numbers 10 men, to whom are paid \$125, weekly. Having been so recently established, the annual production cannot be determined.

ROBERT C. WINTERS. 20 Lawrence-street. Mr. Winters' business is confined exclusively to the production of horse collars, and his manufactory is the only one in Newark making this branch of industry a specialty. He makes everything in the collar line, and his goods comprise all grades, from the finest coach to the coarse but durable cart collar. Thirty hands are employed, and the weekly pay roll amounts to \$350. The yearly productions amount to \$75,000, and are sold to jobbers in all parts of the country, and sales are also made in Cuba, Mexico and South America.

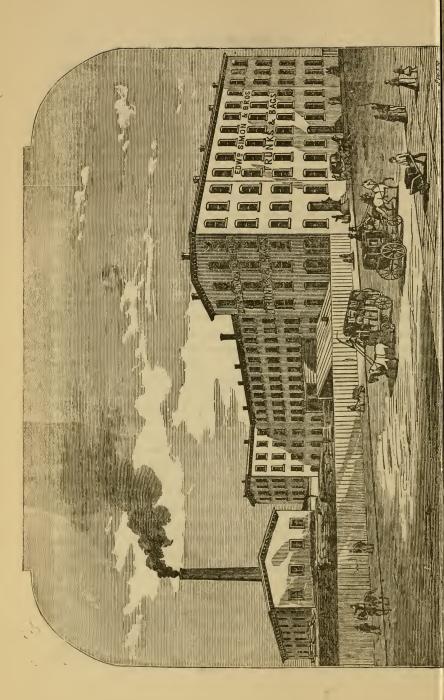
BOOT & SHOE MANUFACTORIES.

The use of boots and shoes as clothing for the feet is only one result of an advanced civilization. Among the nations of antiquity sandals were first used to protect the feet. These consisted of a sole, fastened by thongs, and protecting only the bottom of the feet. They were made from a variety of materials,—wood, leather, felt, or cloth,—and were sometimes shod with iron. In Egypt palm leaves and the fibrous stalks of the papyrus were also used. Sandals varied in their form, some of them turning up in front so as to protect the toes; others covered the sides and backs of the feet, and the thongs with which they were secured displayed great skill in their arrangement, the germ, probably, of the modern devices, which, in the form of buckles, bows, and resettes, decorate the lady's shoe of the present day.

Among the Jews the wearing of sandals was general, and, as with most nations of the East, they were worn only when walking on the rough and uneven surface of the ground, being removed on entering the dwellings. Among the Romans the art of sandal making was carried to a high degree of perfection, and in the luxurious days of the empire, the sandals worn by the women were beautifully and expensively ornamented.

While the fashions of the present day are by many regarded as superfluous, it is interesting to note, that during the middle ages, the fashions of shoes became so extravagant and eccentric as to furnish a theme for adverse criticisms from the pulpit, and sumptuary laws were passed in the vain hope of checking unnecessary display and wasteful expenditure.

Shoes were first in order of appearance, boots being the result of more modern tastes and requirements. Until quite recently, shoes, both for men's and women's wear, were made entirely by hand, and generally by individual workmen, who worked independently of one another, instead of in "teams" as at the present day.



The first invention of any importance in this branch of industry was the pegging machine. The next great invention was the stitching machine, perfected in 1845. Prior to the latter invention, women's shoes were "bound," as it was called, by hand. Its introduction revolutionized this department of industry. Another mechanical triumph of great importance was the introduction of the McKay sewing machine, an invention for stitching the uppers and bottoms together, thus, in a measuse, superseding the awl and waxed thread. Other machinery nearly as useful has greatly improved the manufacture.

While the inventions named have contributed much to bring the boot and shoe interest into greater prominence, the fact remains that in the finer grades of production nothing has yet been found to fully supersede hand work.

Newark has long been known for its prominence in the manufacture of boots and shoes. As in other branches of manufacture, the productions in boots and shoes are of the very finest grades. In this direction Newark is the first manufacturing city of the Union. The boots and shoes produced in its workshops are recognized as having no superior in excellence of material used, and skill in workmanship. The industry is mainly confined to men's and youths' fine boots and shoes, and their superb quality and finish are unequalled.

BANISTER & TICHENOR, 218 and 220 Market-street. The enviable reputation which the boot and shoe manufacturers of Newark enjoy for the high quality and finish of their productions, is no doubt due to the integrity of a few men, as shown by their patience and fidelity in adhering to the better methods and processes of manufacture. The course pursued was doubtless regarded by many as impolitic, but the result is another proof that honesty, in the long run, is the best policy. Prominent among those who have done much to place the high reputation of Newark's productions on a permanent basis, is the firm named above. It was established in 1845 by Mr. Isaac Banister. In 1851 the firm name was changed to Banister & Son by the admission of Mr. James A. Banister as a partner. In 1865 Mr. Lyman S. Tichenor became a member, when the present style was adopted.

They manufacture, exclusively, men's and boys' fine boots and shoes. The leather used in their hand-sewed goods is the best imported French calfskin, including kid and morocco. Each size is made in regular gradations of seven different widths, thus insuring a perfect fit. Messrs. Banister & Tichenor have been very cautious in adopting manufacturing machinery. They, however, make a superior grade of machine sewed goods.

They employ 200 hands, and the weekly pay roll amounts to \$2,800. The annual production reaches \$300,000. The sales extend to nearly all the metropolitan cities of the Union, and is confined strictly to the trade. This firm received the only medal of merit given for this class of goods at the Universal Exposition at Vienna during 1873.

L. BOYDEN & CO., 206 and 208 Market-street. The reputation of Newark as the most prominent point in the country for producing the finest grades of boots and shoes for gentlemen's wear, as already indicated, is the result of the integrity and earnest efforts of a few firms. The patience necessary to bring about this desired end, thus creating a demand for the city's products in the leading markets of the country was not inconsiderable. One of the most prominent firms in maintaining this high standard of quality and finish is the one named above. The house of L. Boyden & Co. was established in 1844 and is therefore one of the oldest boot and shoe manufactories in the city. The superior style, quality and finish of their productions are everywhere acknowledged. Only the best material is used and the most skilful workmen are employed. The firm has introduced a new and improved last, and the boots and shoes made on it are pronounced by dealers and consumers as the most easy-fitting ever worn. In order to overcome the trouble so long experienced, in making to measure, six different widths are furnished to each size, thereby enabling all who keep a full line of these goods to satisfy all the requirements of the trade. Messrs. Boyden & Co. give employment to 150 hands, and the weekly wages paid amount to \$1,600. The goods are sold entirely to the trade and mainly find a market in the principal cities of the Union.

M. B. & I. CANFIELD. 301 Market-street. If high quality and superb finish of production constitute a valid claim to preëminence, this firm is justly entitled to such distinction. Established in 1836, under the style of I. & N. B. Canfield, it is therefore, perhaps, the oldest house in Newark engaged in the manufacture of men's and boys' fine hand-sewed boots and shoes. From that time until now, the name of Canfield has been synonomous with the highest results of the art. Wherever placed on exhibition at industrial institutes, the productions of the firm have uniformly carried off the palm for the highest quality and most skillful workmanship.

The materials used consist wholly of imported upper stock and Baltimore sole. Machine sewing is entirely excluded, as quality, rather than quantity of production, is sought for. Only the better class of workmen are employed, and the present working force numbers 90 hands, their weekly wages being \$1,400. The aggregate value of yearly productions is now about \$160,000; it is, however, constantly increasing, owing to the growing demand for these goods. American taste and culture continually demand more finished articles of dress and adornment, and in their special field the Messrs. Canfield will continue to supply these requirements. Their market extends to all parts of the country.

WILLIAM J. DUDLEY, 312 Market-street. Mr. Dudley began business in 1863. His productions consist of first-class hand-sewed men's, boys' and youths' boots, shoes and gaiters, including the best products of the cable screw wire

process. The usual working force of the factory is about 80 hands, and the weekly pay-roll amounts to \$1,200. Goods of a superior finish are turned out each year to the amount of \$140,000. Mr. Dudley manufactures almost exclusively for the southern trade, and the goods made are, of course, especially adapted to the tastes and requirements of the southern people. Sales are made from Baltimore to Galveston.

The extended business is under the able direction of Mr. J. E. Saunier. Owing to the growing demand for these goods, a change to larger and more commodious quarters has become necessary, and a move to the upper stories of a large building at the corner of Market and Lawrence streets will soon be made.

CHARLES DUCKER, 881 Broad-street. The products of this factory are fine and medium hand-sewed boots and shoes for men's wear. 16 hands are employed, and their wages amount to \$200 weekly. The value of annual production is \$18,000. Mr. Ducker sells his goods mainly to the home trade, though he has buyers in California.

WILLIAM DORSCH, Court and Charlton streets. Mr. Dorsch began business in 1862. Through energy and careful management it has grown and prospered, until now, under his sole control, is one of the first boot and shoe manufactories in Newark. The productions are confined to the medium grades of boots and shoes, comprising the various styles for men's, boys', youths', women's, and misses' wear. Machine sewing is generally used in the processes of manufacture. These goods find a market in nearly all the eastern cities, and are also sold in the west at Chicago and Cincinnati.

The working force of the factory numbers 135 hands, and they are paid weekly \$1,450. The value of the yearly productions reaches \$180,000. The factory is a large and commodious five story brick structure, and is supplied with all the latest improved machinery required for producing the grades named.

L. GRAF & BROTHER, 44 to 54 Lincoln-street; Salesroom, 16 Warrenstreet, New York. The boot and shoe manufactory carried on by this firm is the largest in Newark and also in New Jersey. The business was begun by Mr. Leopold Graf in 1857. He was joined by his brother, Mr. Herman Graf, in 1860, when the present firm style was adopted. The business has rapidly grown and prospered, until now the firm of L. Graf & Brother are among the largest boot and shoe manufacturers in the country. The factory, built of brick, on Lincoln-street, between High and West, is one of the most extensive and well-built manufacturing establishments in Newark. The main building has a frontage on Lincoln-street of 150 feet, being four stories in height and 36 feet deep. A wing, three stories high, extends in the rear, and is 100 feet long and 30 feet wide. The entire factory is fitted up with the most approved manufacturing machinery; the engine is 25 horse power, and two boilers are pro-

vided, one being used to heat the the buildings in winter. The Messrs. Graf, in the face of existing difficulties, by their persistent energy and enterprise, have built up an immense business; their trade extends over the whole Union, and they have salesmen constantly traveling in all parts of the country. Their principal markets are in the South and West, though heavy sales are made to the home trade.

The products of the factory consist of fine and medium grades of men's and boys' machine and hand-sewed boots and shoes. They employ 400 of the most skillful hands, and the weekly pay-roll amounts to \$4,500. The yearly sales of the various grades of goods amount to \$600,000. Owing to the active demand for their well-made goods, the annual product of the factory is constantly increasing.

PATRICK HOGAN, 337 Plane-street. This manufactory was established in 1867, and is the only one in Newark making a specialty of the cheaper grades of machine-made women's, misses' and children's shoes. It is one of the largest shoe factories in Newark. The business as conducted by Mr. Hogan has been prosperous, and is now on the increase. The productions at the present time average 5,500 pairs of shoes per week. As many as 7,000 pairs per week have been made. The working force numbers 170 hands, and the weekly wages are \$1,300. The annual productions of the factory are valued at \$300,000. Mr. Hogan sells entirely to the trade, and his sales are mainly in Newark, New York and Brooklyn.

CHARLES W. KING, 316 to 322 Market-street. This house was established in 1865. It is now under the sole proprietorship of Mr. Chas. W. King. The productions comprise all varieties of boots and shoes, consisting mainly of medium grades. Both machine and hand-sewed work are turned out. The hands employed number 125, and their weekly wages amount to \$1,200. The annual product is valued at \$235,000. The goods are mainly sold to the near by trade.

AUGUST LENZ, 365 Market-street, corner of Railroad Avenue. This factory was established in 1872 by an organized company. Now, however. Mr. August Lenz is sole proprietor. The products of the factory consist of medium grade machine-sewed boots and shoes for men's and boys' wear. The working force numbers 30 hands, and they are paid each week \$300. The value of yearly production is \$50,000. These goods are mainly sold in the eastern markets, though sales are also made in Cincinnati and other western cities. Mr. Lenz is a young man, but through business tact and energy has built up a business which is constantly increasing.

MILLER, McCULLOUGH & OBER, 268 and 270 Market-streets. The products of this manufactory consist of men's fine hand-sewed boots and shoes. The finer qualities of material are used, and only the best processes of manufacture

are employed. The efforts of this firm are constantly in the direction of better grades and more highly finished products.

They employ only skillful workmen. and the present force numbers about 75 hands, whose weekly wages amount to \$1,300. The annual productions are valued at \$150,000. These goods are mainly marketed in the eastern and southern states.

MEYER & LOGAN, 62 Market-street. This factory was started seven years ago. Messrs. Meyer & Logan are thorough going men and are gradually building up an extended and profitable business. They now employ 12 hands, paying them \$120 each week. The yearly production amounts to \$30,000. The products consist mainly of medium grades, and comprise men's and boys' machine and hand-sewed boots and shoes. Cable-wire work is also produced. The goods are mainly sold to the home trade.

THE NEWARK BOOT AND SHOE MANUFACTURING COMPANY, 200 and 202 Market-street. This manufactory is conducted by the above-named incorporated company and was establish in 1869. Mr. George Gabel is President of the company and Frederick Erb, Secretary. The present working force numbers 36 hands, and the wages paid weekly amount to \$450. The annual production amounts to \$60,000. The products of the factory are the better qualities of men's machine sewed boots and shoes. The goods are sold almost wholly to the trade.

SNOW, HOPPER & SANDERSON, 157 Market-street. This firm is the only one in Newark exclusively engaged in the manufacture of ladies', misses' and children's fine shoes. The business, though established but a few years, is in a prosperous condition and constantly increasing. It seems probable from the success of this house that the production of ladies' fine shoes will become an important industry in Newark. Messrs. Snow, Hopper & Sanderson employ 13 hands, and the weekly pay roll amounts to \$200. The annual product is valued at \$50,000. The goods are all machine sewed, and are sold to the near-by trade.

TRUNK & BAG MANUFACTORIES.

Perhaps no single industry better illustrates the increased wants of modern society than the great and varied extent of the interest named above. As a means of transporting personal effects and wearing apparel, trunks and bags of some kind have doubtless existed for centuries. Like many other great

industries, however, which, instead of having an important invention or discovery as an initial point, have been a gradual growth, being the practical results of various ideas and suggestions from as many sources, the manufacture of trunks and bags has no written history. Its growth and present importance are only incidents in the rise and progress of the useful arts.

In the earliest times those people who had migratory habits, as a rule traveled in caravans, and personal luggage was, no doubt, mainly transported in bulk. And, if one could know more of an ancient Egyptian caravan, it would be found that each individual had little to carry that was not possessed in common by all. It is probable that had the religious Crusaders of the Middle 'Ages been obliged to transport "Saratoga" trunks, they would hever have reached the Holy Land.

Doubtless the first and simplest contrivance as a starting point for the modern and highly finished trunk, was the closely tied pack, slung over the shoulder. Its use is most familiar in the vivid picture one has formed of the aspiring youth who, with ardent hopes, left his emerald isle for a more favored western clime. And who cannot recall the plainly finished and common place trunk of half a century ago. But times have changed since then. Now an almost endless variety of trunks, bags and valises, has been created to fill the requirements of modern wealth and refinement. Articles which once were luxuries are now regarded as the common necessities of life. It would be unnecessary here to mention in detail the different varieties and styles of the products named. They are know to all.

The City of Newark to-day has the largest trunk and bag factories in the world. The truth being that the greater part of all the trunks made in the United States are produced here. The importance of this industry in Newark will doubtless continue to increase. Other Eastern cities do comparatively little in this direction, and western towns have as yet accomplished nothing of importance in the way of trunk manufacturing.

The product of Newark's trunk factories amounts to 7,000 trunks per week, or about 360,000 yearly.

The capital required in this industry is very large, and the trunk manufacturers of Newark are, as a rule, wealthy men who have gained their riches through untiring energy and honorable industry.

EDGAR FARMER & CO., 27 and 29 Mulberry-street; salesroom, 18 Courtlandt-street, New York. This house is among the oldest in Newark in the manufacture of trunks and bags. Its factory dates from 1840 when the business was started under the style of Galpin & Farmer, which was changed. however, in a few years, to the present firm name. All styles of trunks and bags are manufactured, though the finer grades receive special attention. The goods are largely sold to the trade. An important feature of the business, however, is a retail department in New York. The firm has many original designs, and

manufacture an extra quality of sole leather trunks. The force employed at the factory numbers 150 hands. The amount of weekly wages is \$1,600 and the aggregate value of yearly productions is \$350,000. These goods are extensively sold over the West and South and are also exported to the West Indies and South America.

F. GRAS, 36 Fair-street. Mr. Gras manufactures bags exclusively, and been in the business since 1872. Twelve hands are employed, and they are paid weekly \$125. The goods turned out annually are valued at \$20,000, and are sold to jobbers.

WILLIAM O. HEADLEY & SON, N. J. R. R. Avenue; warerooms, 8 Warren-street, New York. This house was originally established in 1859, under the firm name of Randolph & Headley, and is one of the oldest trunk manufactories in the country. In 1863 the present firm was organized as above, the son of the present senior partner being admitted, since which time the business has steadily and rapidly increased and the establishment has taken its position as one of Newark's principal manufactories.

Every variety of trunks and bags is made, which are sold exclusively to the trade in every portion of the United States and are also largely exported to South America. The productions of this firm have a standard reputation, great care being taken in the manufacturing department, which is closely supervised by Mr. William O. Headley, the senior partner. All the lumber used for trunk frames in this factory is highly seasoned, thus obviating the shrinkage and cracking so common, and particularly in the cheaper grades of trunks. This firm employs 225 hands, and pay for labor \$150,000 per year or \$2,800 weekly, and the value of annual productions reaches the enormous sum of half a million dollars. There are manufactured and sold each year at this establishment 105,000 trunks, while the number of bags is correspondingly large. It is estimated that no less than 125 tons of sheet iron are consumed yearly.

J. LAGOWITZ & CO., First-street, Essex-street and Railroad Avenue; salesroom, 390 Broadway, New York. During 1854 Mr. J. Lagowitz began the manufacture of trunks in New York. Success attended his efforts, and in 1859 the business was removed to Newark in order to secure better and increased manufacturing facilities. The above style was adopted in 1865 when Messrs. L. Haas and J. Frankle became Mr. Lagowitz's associates in the business. Having been in his employ almost from boyhood they are, therefore, through long and valuable experience, thoroughly practical men, being familiar with all details of the business.

The buildings at the above location now occupied by the firm are among the largest trunk and bag factories in the world, two of them being, respectively, 40x150, and 40x200 feet in size, and five stories high, while the third is of sim-

ilar proportions. They have a fine frontage on the Passaic River, thus securing every convenience for receiving supplies of coal, lumber, etc., at docks controlled and owned by the firm, and to facilitate still further the shipment and receiving of goods, conveniently arranged railway tracks, extending from the factories to the docks, are provided.

A distinguished characteristic of this firm is their great amount of laborsaving machinery, and convenient interior arrangement of factories; the result being unsurpassed facilities for production. A great impetus to their trade has resulted from several patents owned by the firm, among them being a japanned iron frame, which is produced much cheaper than the ordinary brass, plated, or covered frame, and at the same time has a very good appearance. Another article is an elegant wooden handle, made from original designs, which is just as good as those produced in the usual way. Thus the cost of materials is cheapened, and the firm is enabled to manufacture bags at rates which are at once advantageous to both buyer and consumer. Mr. Lagowitz has also the exclusive right for the State of New Jersey of a patent re-sawing machine, and he has triumphantly maintained his title several times, obtaining in each case, heavy damages from the trespasser. In addition to steam elevators, shutes connecting the different floors of the factory are provided, and through these, goods can be immediately transferred from the topmost floors to express wagons at the door.

A specialty of the firm is a great variety of the cheaper grades of enamel-cloth bags and valises, mainly for the western and southern trade. It should not be supposed, however, that their attention is confined to cheap goods, for, on the contrary, they turn out trunks, bags and valises of the highest quality and finish, including fully 140 different styles of bags. The weekly product numbers 1,200 dozen bags, and between four and five thousand trunks. An idea of their extensive business may be drawn from the fact that the working force of the factories numbers 400 hands. Three million feet of lumber are used each year, and ten tons of sheet iron every fortnight. There seems to be scarcely any limit to the firm's productions, as the demand of the country for all grades of trunks and bags is constantly increasing. The weekly pay roll amounts to \$4,000, and the value of goods produced yearly is half a million dollars.

Sales are made to jobbers at the New York office by sample, and the orders being sent to the factory, goods are from there shipped directly to the buyers.

T. B. PEDDIE & CO., 132 Market-street; salesroom, 77 Chambers-street, New York. The senior member of this firm, Mr. Thos. B. Peddie, has long been a leader in Newark's industries, and began the manufacture of trunks in 1835. The business rapidly increased, and soon after Mr. John Morrison became his associate, when the style of Peddie & Morrison was adopted. After the death of Mr. Morrison, in 1861, the business was continued solely by Mr.

Peddie until January of the present year, at which time the firm of T. B. Peddie & Co. was organized by the admission of Messrs. G. B. Jenkinson and R. Dod as partners. Thus the products of this firm have been before the trade of the country for years, and to-day the name of Peddie is familiar to nearly every trunk dealer from New York to San Francisco.

Messrs. Peddie & Co. manufacture everything in their line from the fine soleleather trunk or the elegant Russia-leather bag, to the cheapest variety of trunks for packing purposes, The factory is very extensive, the two main buildings being substantially built of brick, each four stories high and 400 feet long. The interior arrangements are very complete and convenient, thus providing the best manufacturing facilities. There is used each year in the manufacture of trunk frames upwards of 2,000,000 feet of lumber. Ten tons of sheet iron and more than \$15,000 worth of leather are required monthly. At present all the trunk trimmings used are nickel plated. Messrs. Peddie & Co. employ no travelling salesmen, an unusual thing with trunk manufacturers. Notwithstanding, sales are made in all States of the Union, and in almost every city, and there is also a large exporting demand, all of which speaks volumes for the high standing of the firm's productions. At 77 Chambers-street, where their main salesroom is located, the firm owns and entirely occupies a large iron building. Also, in in connection with their factory they have another similar building, which is used for storage, salesrooms and general offices. Sales are made both to the retail and jobbing trade. The statistics relating to this manufactory will be found in the general summary.

HENRY W. POINIER, 12 and 14 Beaver-street. This manufactory has been in successful operation since 1871, and its productions comprise traveling bags in all styles, shawl and sling straps, and the finest grades of sole-leather trunks. Although a young house it has become firmly established, the standard quality of its productions being well known to the trade of the country. These results are due to the energy and enterprise of the proprietor, Mr. Henry W. Poinier, who is a young man of acknowledged reputation as a skillful manufacturer. Appreciating the wants of the trade, Mr. Poinier set out to produce only the first quality of goods, leaving the manufacture of cheaper grades to others. This policy was based on a true theory, the principle of diversified industry. A manufacturer who confines himself to productions of a high quality can doubtless produce a better article than those who go over the whole field of production. Mr. Poinier's efforts have been successful and he has few competitors in supplying to the trade the best bags and sole-leather trunks. As evidence of success he has had a constantly growing business, and in 1873, notwithstanding the financial depression, the gross amount of sales was greater than for 1872. Only skillful workmen are employed, and the present force numbers 50 hands, and their weekly pay roll amounts to \$500. The value of annual production already reaches \$150,000, and is rapidly increasing.

WM. ROEMER, Mulberry and Canal streets; salesroom, 1 Barclay-street, New York. Mr. Roemer came to this country in 1863, and began in Newark, with a small capital, the business of manufacturing trunks and bags in 1865, and through industry and careful business habits he is now permanently established. Since 1865 he has had associates in business but is now sole proprietor. His productions are mainly confined to the better grades of trunks and bags, and consists mostly of the latter, including, however, shawl straps and ladies' belts. An important element of success has been his inventive skill in perfecting new methods and styles of production. Many of the trunk and bag trimmings are expressly made from Mr. Roemer's original designs. invention is an improved shawl strap, simple and perfect in construction, which is in great demand. A specialty is the Patented hinged inlay traveling bag, also one of his inventions. It consists in the combination of a hinged inlay with a pressed or stamped hinged frame, between which the material forming the bag is riveted, producing the strongest and at the same time neatest work. The stitching of the bag, when sewed to the frame, soon gives out, and, hence, a new covering is required, but this result is avoided by the use of the above patent. The manufactory has Mr. Roemer's personal supervision.

The working force of the factory is 45 hands, and they are paid each week, \$600. The annual productions are valued at \$150,000, and they are sold mainly to dealers.

EDWARD SIMON & BROTHERS, Main and St. Francis-streets; warerooms, 64 Reade-street, New York. The productions of this firm comprise every grade and variety of trunks, bags and valies, also shawl straps, trimmings and bag ornaments. In addition, they do an extensive business in buckles for ladies' belts, and all kinds of fancy brass goods, gold, silver and nickel plated. The house was founded in 1863 by Mr. Edward Simon. The beginning, as compared with the firm's present business was small, but by integrity and perseverance Mr. Simon surmounted all obstacles. In 1865 his two brothers, Messrs. William and Samuel Simon, became members of the firm, when its present style was adopted. During 1869 Mr. Morris Schwerin was also admitted as a member of the firm, which to-day is composed of the above-named gentlemen.

Their factory on Main-street, near East Ferry-street Station, on the Newark and New York Railroad, is very extensive, and its facilities of production are unsurpassed. It is four stories high and substantially built of brick; has a frontage of 100 feet on both Main and St. Francis-streets, with a depth of 200 feet from street to street. It covers 12,800 square feet, has 460 openings, and will accommodate, when the increasing business requires, 800 workmen.

Regarding the methods of manufacture many interesting features might be mentioned. Unlike most firms in their line Messrs. Simon & Brothers are dependent on no outside factory, except for the raw material. Nearly every thing is brought to the factory in the rough, and there transformed and finished for various uses; even all the necessary tools are made on the premises of the firm. All the locks and bag trimmings used by the firm are of their own manufacture. The amount of lumber used annually for the frame work of trunks, is 1,500,000 feet, and it is prepared in the company's own saw and planing mills. Fifty hides are used daily and the firm consumes each month a ton and a half of sheet brass and four tons of sheet iron. The trunks made, are of all styles, from the immense sole-leather or zinc covered "Saratoga" to the more modest little double-folding trunks, so useful for short journeys. The varieties of bags vary, from the rich purple morocco valise down to the little wallets so much used by the ladies in shopping excursions.

The manufacturing department is under the immediate superintendence of Mr. Morris Schwerin. The working force of the factory numbers 500 hands, and wages are paid weekly to the amount of \$4,000, or over \$200,000 per year. The yearly productions are valued at half a million dollars.

At present writing the factory is kept running night and day in order to fill the orders received. The goods of the firm have an established reputation, and are sold in all parts of this country and largely exported to Europe, Cuba, Peru, Chili and Africa.

LEATHER BELTING MANUFACTORY.

CHARLES W. WALKER, 288 Market-street. Mr. Walker manufactures custom made oak-tanned leather belting. The stock used consists of the best Pennsylvania leather. It is stretched on the most approved and powerful machine in use. He caters to the wants of consumers exclusively. His goods are sold over the whole country, and have a fair exporting demand. Mr. Walker employs six hands, and pays weekly, wages to the amount of \$125. The annual production is valued at \$25,000.

MANUFACTURES IN LEATHER—SUMMARY.

| Manu | facturers in leather of every kind | 81 |
|-------|------------------------------------|-----------------|
| Total | number employees | 6,415 |
| " | amount of wages paid weekly | \$73,310.00 |
| 46 | wages paid per year | \$3,812,120.00 |
| 44 | value of annual productions | \$14,977,000.00 |

Comprising:

| | | No. of em- ployees | Weekly Wages. | Annual Production. |
|------------------------|----|--------------------------|------------------|-----------------------|
| *Leather Manufactories | 32 | 1,627 | \$ 18,880 | \$5,494,000 |
| Morocco " | 6 | 604 | 7,050 | 2,275,000 |
| Saddlery & Harness " | 17 | 822 | 10,685 | 1,500,000 |
| Trunk, Bag, &c. " | 9 | 1,792 | 18,150 | 3,185,000 |
| Boot & Shoe " | 15 | 1,552 | 18,220 | 2,498,000 |
| Russia Leather " | 1 | 12 | 200 | |
| Leather Belting " | 1 | 6 | 125 | 25,000 |

^{*} In the above summary, for reasons already stated, one leather manufactory has been omitted.

IRON

AND ITS MANUFACTURES.

While the use of iron is of very ancient origin, gold, silver, copper and other metals preceded it. The reason for this may be found in the fact that iron does not exist in a pure state, and is only found in chemical combinations known as *ores*, and the ancients not being familiar with smelting processes, were unable to utilize the metal named.

It is one of the most generally diffused products of nature. In one form or another it is almost universally diffused through the organic and inorganic world. Scarcely a stone or rock can be found without a trace of this metal, and nothing visible around us is wholly free from it. It is found in one's blood, and intensifies the brilliant colors of the rose, while spectral analysis has fixed it's presence in the stars.

The history of its discovery and use is mainly lost in the remoteness of antiquity, since from its affinity for oxygen, and its consequent tendency to rust and thus lose its form, it can hardly be expected that any tangible evidence of its use in ancient times should have been preserved to our day. It appears, however, that the Assyrians were well acquainted with the manufacture of iron, and they employed it, together with bronze, in useful and ornamental works. They had also the art of coating iron with bronze, and objects thus prepared have come down to us, the iron having been preserved in the metallic state by its bronze covering. The East Indian natives still prepare iron excellently, though their methods and appliances are of the rudest and simplest kind. As it is known that they had this ability before the time of Alexander it is probable that the use of iron was known quite generally at a very early stage of history. In Theban tombs, which date about 4,000 years ago, pictorial inscriptions are found which represent persons using iron utensils. It is mentioned by Homer, and from what he says the inference is drawn that it was scarce and valuable then, and also that the Greeks were only acquainted with malleable iron.

Aristotle spe ks of the iron mines of Chalbyia, and describes the methods of working the ores. These mines were very famous, and from them was derived the word *chalybs*, given by the Greeks to steel, and from it is formed the term chalybeate for those waters containing iron in solution.

There is little record of iron making in Europe during the first seven centuries of the Christian era. The discovery in Sweden and Norway of slag heaps six centuries old during the sixteenth century, showed that the mining of iron was extensively practiced at an early age. Yet the processes were very rude and it was a long time before improvements were introduced, and they have only come with the gradual dissemination of intelligence. In fact, the extensive use of iron in the arts and sciences is so marked an element of modern civilization, that it was said by Locke, "Should the use of iron be forgotten, the world would gradually but surely recede to a condition of comparative barbarism."

The first production of cast iron took place in the fifteenth century, and so far as the records show, the first articles cast were guns, and stoves were thus made in 1490. In England cannon were first cast about 1530. On the Continent the refuse heaps from the old Roman workings, on account of the improved methods of blasting, were profitably reworked, and some of these supplies are said to have furnished material for new furnaces during a period of two hundred years.

In England the progress of iron manufacture was quite rapid. It was melted with charcoal as a fuel until 1612, when bituminous coal was introduced for this purpose. 1784 a patent was granted for "shingling, welding and manufacturing iron and steel into bars, plates, and rods, of purer quality and in larger quanity than heretofore, by a more effectual application of fire and machinery." It is unnecessary here to follow the various improvements in smelting and refining ores, not to speak of the gradual transformations of iron into various articles of utility.

The manufacture of iron in the United States began soon after the settlement of the country, and at the time of the Revolution was carried on to a greater or less extent in each of the thirteen colonies. In 1813 Frederick W. Geisenhainer a minister of Schuylkill, Pa., having experimented with the use of the hot blast with anthracite, obtained a patent for the process, and in 1835 produced the first iron so made. In 1841 the process of consuming the gases generated in process of smelting, was adapted to the use of anthracite, and has since come to be used very generally in the United States, producing a saving of from two to three dollars a ton in the use of fuel. Among the early settlers of this country, and even during the last century, many domestic utensils of iron, which are now met with in the humblest dwelling, were quite unknown, or else highly prized for their rarity. A century ago teakettles were made of wrought iron exclusively, and the rarity of cast iron vessels shows how limited was their production, even in England, whence the supply was chiefly obtained. The plentiful supply of these conveniences of the present time, is largely due to the introduction of anthracite in the place of charcoal for fuel in the furnaces.

Iron, to increase its usefulness, is subjected to various chemical changes, the result being known as wrought iron, cast iron, malleable iron, &c., and also the valuable product known as steel.

Chemically considered, steel occupies an intermediate position between wrought iron and cast iron. Wrought iron is simply iron, while steel contains an addition of from one to one and a half per cent. of carbon; and cast iron contains about four per cent. of carbon. It may therefore be made by a process which shall give to wrought iron the required amount of carbon, or by another which shall eliminate from cast iron the excess of that substance. Of the reason why this apparently slight change should produce such marked alterations in the properties of iron, nothing is known as yet. The fibrous constitution of wrought iron appears by this process to become granular in texture, approximating cast iron in this respect, and while it loses in ductility and malleability, it becomes elastic and harder.

The early process of making steel is most probable about identical with that still in use in India, and which has not varied since very ancient times. It is supposed that the use of steel was known to the Egyptians. The steel manufactured in India has never been excelled, and it was from this that the celebrated Damascus blades were made. The art of thus tempering blades has declined, and though experiments have been made in Europe to imitate the process, they were unsuccessful.

The main use of steel is for the manufacture of cutting utensils of various kinds. It may be defined as any kind of iron, which, when heated to redness and suddenly cooled by being plunged into cold water, become harder. Every kind of malleable or flexible iron which can be hardened by this process, is a steel.

Numerous attempts have been made in modern times to discover some method for shortening and cheapening the process of making steel. It was formerly made, as already indicated, by carbonizing iron; that is, by adding to iron the carbon which it is converted into steel. But as steel holds an intermediate position as regards the amount of carbon it contains between iron and cast iron, it occurred to scientific men that steel could be produced by de-carbonizing cast iron. This discovery was the result of chemical science, whereby the composition of steel could be accurately determined. There were several processes prepared for reaching the desired end, but the only successful one has been the Bessemer process; and its process is to burn out the carbon by supplying the iron while in a state of fusion with currents of air, thus supplying the oxygen necessary for combustion. The full results of this invention are not yet fully realized, but enough is known to justify the statement that by the Bessemer process the production of steel has been so cheapened as to give a great impetus to all those manufactures wherein steel is an important element.

The various manufactures in iron constitute a large part of Newark's industries. The city has a reputation which extends over the whole country, for the production of malleable and grey iron castings and machinery of all varieties. The special features of this branch of industry will be found under the notices of the several manufacturers.

STEEL MANUFACTORY.

BENJAMIN ATHA & COMPANY (NEWARK STEEL WORKS), foot of River-street. The manufacture of steel in Newark was begun by the above firm in 1864, under the style of Prentice, Atha & Co., and the business was thus continued until 1871, when the present firm name was adopted. The several members of the firm are Messrs. Benjamin Atha, John Illingworth and Patrick Doyle. The two latter gentlemen are practical manufacturers, and by their knowledge of the business and rare skill have greatly contributed to the excellent reputation of Newark steel in the markets of the country.

About fourteen years ago very little steel was made in the United States, as the foreign manufacturers fairly monopolized the market. A great change, however, has been brought about since then. Through the energy and enterprise of a few manufacturers fully four-fifths of the steel consumed in the country to-day is the product of home industry, thus securing another triumph for American enterprise and industrial skill. Prominent among those who have contributed to this result is the above firm. No house has been quicker to appreciate the wants of home manufacturers or more successful in producing the desired qualities of steel.

The works are among the largest in the country, and are situated on the Passaic River, thus securing convenient transportation facilities. They have three trains of rolls, respectively, sixteen, twelve and eight inches in size, and there are four steam hammers in operation. The productions of the Newark Steel Works are known as the best refined cast steel, a specialty being a fine quality of file steel, and including the several grades of agricultural cast steel, cast spring steel, railway cast steel, machinery cast steel, and the various qualities requisite for implements of war, while among the miscellaneous brands may be mentioned hammered cast steel, table cutlery, trap spring, skate, wagon axle, sleigh shoe, and safe steel. American steel manufacturers, in competition with the foreign producers, have met with the greatest difficulty in making those particular qualities which result from the application of a

large amount of labor on a small amount of material, an illustration being the production of the best axe cast steel. These difficulties will, however, soon be entirely overcome, thus monopolizing the home market. In this direction Messrs. Atha & Co. are making special efforts, which will doubtless soon meet with the fullest success.

The hands employed in the works number 90 men, and the weekly pay roll amounts to \$1,200. The yearly production of steel is valued at half a million dollars, and is mainly sold to eastern manufacturers, and principally in New England; now, however, the trade is extending westward, and will doubtless rapidly increase in that direction.

IRON & MACHINERY MANUFACTORIES.

OSCAR DARNETT, 34 and 36 McWhorter-street. This hardware and machinery manufactory was established in 1845, and is now one of the prominent iron works of Newark. Mr. Barnett is a leading manufacturer of malleable iron castings, and also makes a specialty of carriage castings, patent bedstead fastenings, brass moulders' flasks, and Barnett's blind hinges, the last named being made from original designs; also, an extra quality of machinists' tools. Productions are sold over the whole country, and also have an exporting demand, shipments being made monthly to Australia. The foundry and machine works give employment to 150 hands, and their wages each week amount to \$1,500. The annual production of castings, hardware and machinery, amounts to \$150,000.

HEWES & PHILLIPS, Orange and Ogden streets. In 1845 Messrs. J. L. Hewes and J. M. Phillips, commencing business under the present style, began in New York the manufacture of steam engines, boilers and machinery. They removed to Newark, however, in the following year. Their works are perhaps the oldest in Newark and even in New Jersey. The business has been conducted under the same firm name for 29 years, and its growth has been identical with the rise and progress of Newark as a manufacturing city. Within the last year, however, their business relations have been severed by the death of Mr. Hewes, and thus were friendly business relations of three decades brought to a sad termination. Mr. Phillips now continues the business under the old name. Both members of the firm were apprentices with Newark's great inventor, Seth Boyden.

The productions of the works named consist mainly of stationary, portable

and marine steam engines and boilers, sugar estate machinery, mill gearing, machinists' tools and general machinery; brass castings are also produced. The products of the firm are everywhere interwoven with the industrial development of the country.

One hundred hands are at present employed, though the usual force is 300 men, and the maximum 400. The present weekly pay-roll is \$1,400, though it has been as high as \$5,000, the decrease being caused by the general depression in the iron trade. The annual production is valued at \$300,000. Engines and general machinery are sold in all parts of the country, and are shipped to Cuba, England, China, South America, and in fact, the whole world. Messrs. Hewes & Phillips are extensive manufacturers of mining machinery, and they largely supply the minning regions of the Pacific slope, Mexico and Venezuela. The works cover an area of more than two and a half acres of ground. The main building is 176 x 60 feet in size and three stories high. A part of the works extend along the Passaic river, and a dock 190 feet long is owned by the firm, and it is provided with a forty ton crane for lifting machinery into boats. At this dock, vessels are loaded for the West Indies. Thirty tons of mining machinery were recently shipped to Colorado on one railway train.

This immense establishment is peculiarly one of Newark's representative institutions. The capital at first required was mainly honesty, untiring energy and a thorough acquaintance with every detail of the business. Its growth and prosperity has been co-equal with the development of Newark into her present wide proportions, and as the varied wants of the country increase, the iron works of Messrs. Hewes & Phillips will not be backward in supplying the demand.

DICKINSON & ROWDEN, 63 Hamilton-street. This firm manufactures bank note engravers' machinery, etc., and was originally established in 1852 by Mr. Charles W. Dickinson, and is to-day without a rival in their special field of industry. The present firm name dates from 1862, when Mr. George Rowden became a partner in the business. Their productions consist of geometrical lathes, engravers' lathes, ruling machines, transfer presses, numbering heads for numbering bank notes and railroad tickets, rotary feed presses, and watch chain link machines, the last being the first one of Mr. Dickinsons many patents. They also make jewelers', chemists' and lapidists' tools, and fine machinery in general. The goods find a market mainly in the eastern States, but are sold all over the country, including Mexico. The first geometrical lathe was patented by a man named Spencer, and afterwards other lathes were made. The history of Mr. Dickinson's unrivalled success in this direction is briefly as follows: In 1862, when engaged in the manufacture of jewelers' tools, he received an order from Chicago parties for a geometrical lathe. Without previous experiment he at once began the work and the efforts, aided by his inventive genius,

were crowned with success, the result being the most perfect lathe of the kind ever produced. The original parties not fulfilling their contract, the lathe was patented and sold to the United States Bank Note Company for \$2,000, and on their failure it was sold at Sheriff's sale for \$4,500. The geometrical lathe thus brought to perfection, is used in the United States Treasury Department, and by all the principal bank note companies. Six hands are employed by the firm, and their wages amount to \$125 per week, the annual productions being valued at \$10,000.

HAYDEN & OSBORN, 28 Orange-street. This machinery manufactory was established in 1868 by Messrs. George Hayden and J. B. Osborne. Their productions comprise general and special machinery of all varieties, including pattern and model making and experimental machinery. A specialty is made of Woodruff's patent balance draft regulator for steam boilers, and an extensive business is carried on in its manufacture. This regulator is a combination of the very best known principles of steam engineering, being the result of long experience in this special field of mechanism. While being strong and durable it is simple in construction and can easily be applied to any boiler. For these reasons it is meeting with universal favor. Messrs. Hayden & Osborn, manufacture anything in the way of light machinery. They employ 20 hands, the weekly pay roll being \$350. The value of annual productions is \$35,000, and they are mainly sold in the home market.

EDWARD WRIGLEY, 19 and 21 N. J. Railroad Avenue. At this factory a general machine business is carried on, a specialty being the manufacture of shafting, pulleys and hangers. Mr. Wrigley has been established in the business since 1865. He employs eight men, pays weekly wages to the amount of \$125, and produces each year the articles named to the value of about \$10,000.

MORRISON, SINCLAIR & CO., 10 to 23 James-street. In 1862 this firm began business as engineers and machinists. They now manufacture embossing and hydraulic presses and general machinery, a specialty being Krausch's patent mash machinery for brewers' use. Their trade is mainly in the home market, though sales are made in all the States. The working force numbers 40 hands, and the weekly pay roll amounts to \$600. The aggregate value of annual productions is \$75,000.

H. W. CHAPMAN, 11 Mechanic-street. Mr. Chapman manufactures light machinery and tools, and makes a specialty of jewelers' foot presses and tools. He usually employs three hands, paying them weekly \$50, and the value of his annual product is \$5,000.

WILLIAM BLUM, 24 Mechanic-street. Mr. Blum manufactures light machinery and bucket tongues. He has been in business eight years, and employs two hands, the weekly wages being \$25, and the value of annual production \$5,000.

by Mr. Theodore M. Tucker in 1864. Afterwards Mr. Arthur H. Lowerre became his associate, when the above style was adopted. The firm manufacture fluting machines almost exclusively, a specialty being the well-known "Eureka" machine, one of Mr. Tucker's own inventions. It has an extensive sale and is exported to Europe and South America. The right of its manufacture is secured by letters patent both in Great Britain and the United States. They are the largest manufacturers of fluting machines in this country, and the machinery employed is of their own invention. The "Eureka" was awarded the first premium at the American Institute Fair in 1870. In addition, the firm makes piano-stool screws, another result of Mr. Tucker's inventive skill. Light machinery is also made from brass or iron. Ten hands are employed, the weekly pay roll being \$150, and the value of annual production, \$25,000. Sales are made to the jobbing trade.

J. S. MUNDY, 7 Railroad Avenue. This manufactory was established in 1859 by Dutton & Wilson, who were succeeded in the business by Mr. Mundy in 1869. A general machinery business is carried on, including hoisting, pumping and mining engines. The specialty of the house being the celebrated "Mundy" friction and clutch hoisting engine, which is admirably adapted for dock hoisting, pile driving, quarries, mines, etc. Several of these engines are in use by the N. Y. Department of Docks, and are highly commended, having raised a weight of 16,000 pounds with perfect ease. The friction drum is a great improvement in hoisting machinery and forms a perfect brake in lowering. Mr. Mundy is now engaged in building for New York parties one of these celebrated engines, which, when completed will be the largest hoisting engine in New York, being 40 horse power.

There are employed at this manufactory 12 hands, who are paid \$200 weekly. The products are sold principally in New York and Philadelphia, and are valued at \$10,000 per year.

CYRUS CURRIER, 21 Railroad Place. The foundry and machine shop now known under the above name, is one of the oldest iron manufactories in Newark. It was established in 1842 by Davis & Currier, and after successive changes Mr. Currier is now sole proprietor. He has been a pioneer in the iron industry of Newark, having, when a young man, worked with Seth Boyden. He has been closely identified with the growth of machinery manufacturing and has done much to bring about its present great prominence. He produces a large amount of general machinery, but makes a specialty of paper mill machinery. In this particular he is one of the most prominent manufacturers in the country. Many of the first paper mills of the United States are supplied with his machinery. The latest improved styles are made, and in the most substantial manner. In addition to his production of machinery,

Mr. Currier carries on an extensive business in iron and brass founding, and is said to have a larger variety of patterns than any other manufacturer of castings in Newark. He has a large local trade, but sells heavy machinery, mainly of the kind named, in all parts of the country.

The works give employment to 60 hands, and their weekly wages amount to \$800; the aggregate value of annual productions being \$135,000.

T. M. WARD & CO. (WARD'S GLOBE FOUNDRY), 456 to 466 Market-street. This manufactory was established in 1850 by J. B. Ward. The present firm succeeded to the business in 1869 and its members are Messrs. T. M., M. R. and G. M. Ward. They make builder's iron work, sad irons and general castings. Goods are sold in the home market and New York. Fifty hands are employed, the weekly wages being \$600, and the value of annual productions \$60,000.

A. & E. C. HAY (EAGLE IRON FOUNDRY), 9 to 13 Alling-street. This iron foundry was established in 1832 by Mr. J. B. Hay, whose sons, Messrs. A. & E. C. Hay, are his successors in the business. The firm as at present organized dates from 1859. The productions mainly consist of iron castings for machinery, railroads and building material, and also include bakers', hatters' and tailor's furnaces and factory stoves. Thirty hands are employed, and the weekly pay roll amounts to \$500. The yearly productions are valued at \$100,000, and are constantly increasing.

WRIGHT & SMITH, 9 to 13 Alling-street. These machine works were established in 1855 by Mr. L. Wright, who continued as proprietor until 1862, when Mr. Chas. B. Smith became interested, and since then the business has been conducted under the present style. The firm manufactures steam engines, machinists' tools, wood-working machinery, jewelers' machinery, and general out-fits for factories, planing mills, &c. They are specially engaged in manufacturing Wright's variable speed attachment for sewing machines, which instantly changes the speed of a machine by a positive power. The business of the firm has not yet fully recovered from the effects of the general depression in the iron iudustry. The working force now employed numbers 50 men, and the weekly wages are \$700. The value of annual production is \$55,000.

SEYMOUR & WHITLOCK, 43 Lawrence-street. This firm began business in 1864, under the above style. It is regarded as one of Newark's repersentative machinery manufactories. They are young men and began business with little capital, and their present success is the just reward of industry and integrity.

They manufacture iron and wood-working machinery, Baxter's portable steam engines, shafting, pullies, self-oiling hangers, &c. The business, however, is mainly confined to the production of wood working machinery, and in this direction they have won an enviable reputation. They have little or no local

trade, the machinery being all sold abroad. Their business extends to nearly all parts of the country, and their wood-working machinery is sent to France, Germany and Switzerland. At present they are filling a large order from New Zealand.

Thirty men are employed in the manufactory, and the amount of weekly wages paid is \$300. The gross amount of machinery made annually is valued at \$60,000.

SKINNER, LEARY & LINDSLEY, 23 to 27 Lawrence-street. This firm began the manufacture of machinery in 1866, since which time the business has been conducted under the present style. Their productions are stationary and portable steam engines, contractors' machinery, derricks, shafting, &c. A specialty is made of hoisting engines, together with freight and passenger elevators for factories and stores. Their business is mainly confined to Newark and neighboring cities. The firm gives employment at present to 16 hands, and wages to the amount of \$300 are paid weekly. The amount of yearly productions are valued at \$40,000.

JAMES DONALDSON, Hedenberg Works. This iron foundy was established in 1862. The products consist of a general variety of castings, which are sold to the home trade. Ten hands are employed, and the weekly wages are \$100, the annual productions being valued at \$12,000.

WM. COVENTRY & CO., 101 N. J. R. R. Avenue. This firm does a general business in the manufacture of iron and brass castings. Ten hands are employed, and wages are paid weekly to the amount of \$125. The value of yearly productions is \$15,000.

SURERUS & CO., Hedenberg Works. This firm has been established since 1863. The productions consist of various kinds of machinery, a specialty being nat machinery. Five hands are employed, the weekly wages being \$80. The annual product is valued at \$6,000.

GRANT & CO., Hedenberg Works. This firm was established in 1872, and the present members are H. T. Grant, S. C. Morehouse and S. D. Kingsland. They make light machinery and models, and are the sole manufacturers of Widmer's patent cap rifles for target practice. This rifle is a novelty, and is commonly used in shooting galleries. It is loaded with a B shot and without powder, the explosion of a common percussion cap being sufficient to propel the shot with swiftness and accuracy. It can be loaded 100 times for ten cents. They are becoming popular for target shooting at short range. The firm also make French's sensational target, and equipments for breech-loading shot guns. Ten hands are employed, the weekly pay-roll being \$160, and the annual production \$10,000.

McFARLAND & McILRAVY, 9 and 11 N. J. R. R. Avenue. The iron foundry now conducted under the above style, was established about 30 years

ago. The present firm dates from 1870. Columns, girders, lintels, engine lathes, planes, chill boxes, and all kinds of castings, are manufactured. A specialty is made of *Kearney's improved grate bars*. Thirteen hands are employed, the weekly wages being \$200, and the annual production \$15,000.

THE HUNTINGTON MACHINE WORKS, E. W. ROFF, Proprietor; 135 and 137 Halsey-street. The well-known Huntington Works were established in 1837. The present proprietor, Mr. Roff, has long been engaged in designing and improving wood-working machinery, and as a result, the production of the works is mainly in this direction. By his study and inventive skill he has succeeded in producing a fine class of machines for carrying on the various processes of wood-working. Planing machines from the Huntington Works are very extensively used. There are also made band saws, Blanchard spoke machines, turning and mortising machines, and in fact nearly all machinery used by workers in wood. In addition, shafting, hangers, pulleys, &c., are made.

The Huntington Machine Works is among the first of its kind in Newark, and is well-known abroad. Its productions are sold in all parts of the country, from Maine to California, and the wood-working machines made are sent to the planing mills of Enrope. Thus Europeon industrial progross is dependent on American enterprise and invention. Mr. Roff at present employs 75 hands, and the weekly pay-roll amounts to \$1,300. The total value of annual production is \$125,000.

PASSAIC MACHINE WORKS, WATTS, CAMPBELL & CO., Proprietors; Passaic and Ogden streets. The business now conducted under the above style was established in 1851 by Watts & Belcher. The present firm was organized in 1865, and its members are Messrs. Wm. and George Watts, Daniel T. Campbell, and Henry Parsons. They manufacture steam engines, machinists' tools, and machinery in general. An extensive business is carried on in the production of sugar estate machinery, mainly for the sugar plantations in Cuba, the firm having in hand at time of writing an order from that country for 200 tons. The other products of the works are largely disposed of in the Eastern market, though sales are made in the West and South.

Messrs. Watts, Campbell & Co, are not behind in supplying the demands of industry for new and improved machinery. The works give employment to 125 men, and wages to the amount of \$1,700 are paid weekly. The yearly products of the manufactory are valued at \$275,000.

A. J. DAVIS, 93 N. J. R. R. Avenue. This manufactory was established in 1862. Mr. Davis makes a general variety of machinery, including steam engines, hoisting machines, hat machinery, shaping machines, drain-pipe machines, and shafting, hangers and pulleys. He also does mill work of all kinds, and his productions are mainly for the home market. Twenty hands

are employed, and the weekly pay roll amounts to \$350. The whole amount of yearly productions is valued at \$55,000.

J. H. BARLOW, 28 Orange-street. Allusion has already been made to the influence of the late Seth Boyden on the industrial growth of Newark. His success, as the first producer of malleable iron in this country, has been mentioned. It is interesting to note that in the malleable and grey iron foundry, at the above location, Seth Boyden, on July 4th, 1826, first succeeded in making malleable iron castings, and also that there has been a continuous succession of firms down to the present time. Soon after the foundry was in successful operation it was purchased from Mr. Boyden by a Boston firm, who succeeded him in the business. Since then it has been conducted by successive firms down to 1871, when J. H. Barlow became sole proprietor. Mr. Barlow was associated for years with the preceding firms, and is therefore one of the oldest iron manufacturers in Newark. He mentions with just pride the historic associations of the foundry in which his business is carried on.

The products of the foundry comprise a great variety of malleable and grey iron castings, a specialty being stock, saddlery and coach castings, of which a large amount is constantly kept in store. In addition, Cowell's screwless sash pulleys, sash weights, and sash cord fastenings are made.

The goods are mainly sold to Newark manufacturers, though other Eastern markets are in part supplied. The working force of the factory numbers 45 hands, the weekly wages \$400, and the value of annual production \$65,000.

J. W. HYATT, 45 Mechanic-street. Attention has already been called to the many useful inventions contributed to industrial progress by residents of Newark. No recent product of mechanical skill is of more importance in the arts than Hyatt's lathe for turning spheres, invented and patented by the abovenamed gentlemen, and illustrated on opposite page. On account of its value in mechanics it has been deemed worthy of insertion in this volume.

The production of an exact sphere in the ordinary lathe is a very slow process, requiring great skill and care. The difficulty is still greater when a sphere of a specified diameter is required. Hitherto, the production of spheres in lathes specially constructed for that purpose, and designed to obviate the necessity for that training of hand and eye necessary to produce a sphere in the ordinary lathe, have not been so successful as to supercede the old method. The importance of a successful lathe for the purpose named is best shown in the production of billiard balls, as, on account of the growing popularity of the attractive game of billiards, their manufacture is annually increasing.

It is claimed for the Hyatt lathe that the difficulties heretofore met with have been entirely surmounted, and that it is possible to turn in it a sphere of homogenous material so accurately that, floated upon a surface of mercury, the ball will remain in any position in which it may be placed. The lathe is

THE HYATT LATHE FOR TURNING SPHERES.

moreover, extremely simple in construction and easy to operate. It may be attended satisfactorily, after only a short period of practice, by persons only moderately accustomed to the manipulation of machinery. The chuck used is shown standing upon the table which supports the lathe in the foreground of the illustration. There are two of these chucks, which hold the ball by pressure between them. The chucks are attached to opposite spindles, and move toward each other simultaneously by means of right and left screws in the heads. These screws are operated by two spur-wheels, which mesh into two other spur-wheels attached in common to a single shaft passing longitudinally through the bed of the lathe. To one of these wheels are attached handles, by which means both the lower spur-wheels are moved together simultaneously, imparting motion to the wheels which mesh with them, and thus actuating the screws in the heads, by which the chucks are moved equally toward each other. In this way the ball is chucked in such a way that its centre is constantly kept over the centre around which the tool-post is carried. This tool-post is attached to a disk placed in the centre of the lathe, the edge of which disk is toothed to engage with a worm actuated by a crank. In other words, the tool-post is attached to a worm-gear accurately centered in the middle of the lathe in such a way that its centre is in the same vertical line with the centre of the sphere to be turned. The tool-post is moved from or toward the centre in the usual manner as shown, and is carried about the centre in an exact circle by means of the worm gear to which it is attached. The chucks are formed in such a way that the sphere may be held in any position without a change of the position of the centre, the end of the chucks being concave on the inside and bevelled on the outside in such way that their contact with the sphere is practically reduced to parallel circumferential lines. Provision is made for taking up wear in all parts of the lathe in which wear would cause inaccuracy in working.

In re-turning billiard balls which have become chipped, it is desirable to turn as large a sphere as the material will permit. In order to do this, the chipped side is first turned off to the depth of the imperfection. For this purpose auxiliary chucks are used of various sizes, a set of which goes with each of the lathes. These chucks are shaped to fit, and are placed against the interior of the principal chucks, in order to throw the balance sufficiently out of the centre to enable the defective part to be turned off. A portion of the ball is then cut away to remove this imperfection. The auxiliary chuck is then taken out, and the ball accurately centred as before until the turning is completed. This enables the largest possible ball to be turned out of the imperfect one. Although we have described this lathe principally with reference to turning billiard balls, it is evident that it is adapted to the turning of all spheres of whatever material. A very important application will be the turning of shot

and shell. This hitherto expensive process will be very greatly cheapened by the use of the Hyatt lathe. Small sizes adapted to the wants of jewelers, and for turning diminutive spheres, are manufactured. For turning ball valves the lathe is obviously well adapted.

Since the illustration referred to was engraved, the inventor has produced an attachment for turning irregular forms, which in connection with the lathe is of very great advantage, but which cannot easily be described without an engraving.

BOLEN, CRANE & CO., 23 to 29 Plane-street. The iron works now known under the above style, were established in 1859 by Mr. C. M. Bolen, and in 1866 Mr. T. S. Crane became his associate in the business. The present firm dates from 1872, when Mr. Frederick K. Day was admitted as a partner. The business has steadily increased, and at present the house occupies a prominent place in the iron industry of Newark.

Messrs. Bolen, Crane & Co. give special attention to the manufacture of machinists' and boiler makers' tools, and an extensive business is done in furnishing tool equipments for locomotive repair shops. Forging is extensively carried on, and steam engines, steam pumps, and general machinery, are made, and in addition every description of machinery is designed or improved for manufacturers. Mr. T. S. Crane is well known as a skillful draughtsman, and on this account the firm is largely engaged in building and perfecting machinery from original designs, for inventors.

The business of the firm extends to all parts of the country, and machinery is shipped to nearly every State in the Union. The usual force employed numbers 55 meu. The weekly wages paid, and the amount of annual production, are included in the summary of this branch of manufactures.

D. M. MEEKER & SON, 87 to 95 Clay-street. The malleable and grey iron foundry known under the above style, was established in 1843 by Gardner, Harrison & Co. In 1858 the firm name was changed to Pierson & Meeker, and during 1861 Mr. D. M. Meeker, who had been associated with the firm from its inception, became sole proprietor. The business was continued without further change until 1873, when the present firm was formed by the admission of the son, Mr. Stephen J. Meeker, as a partner.

The productions of the foundry were at first confined to malleable iron castings, but afterwards grey iron was included, and they now comprise, in addition to the articles named, bronze and German silver castings, a specialty being cast iron window sashes, designed and patented by Mr. Meeker. This sash is almost an exact imitation of wood, and is very extensively used in all building operations wherein strength and durability are specially required. Large quantities of Clark's patent carriage umbrella holders are also made from malleable iron

for the patentee, who does business in Wisconsin. Their manufacture was attempted in that State and afterwards in Chicago, but all efforts were unsuccessful, and the patentee was obliged to enlist Newark skill and enterprise, thus giving further evidence of Newark's industrial supremency. Another specialty of Messrs. Meeker & Son is the manufacture of Simpson's patent bank check cancelling machine, the invention of Mr. Wm. M. Simpson, a resident of Newark. This machine also, is the result of Newark's industry and inventive skill, and is extensively used by the banking institutions of the country by whom it is considered the best device known for the purpose named. A general business of iron founding is carried on, and the firm makes a great variety of small iron castings. Goods are sold mainly in New York and New Jersey, though sales are made in all parts of the Union. Fifty workmen are employed, and the weekly pay-roll amounts to \$500. The annual production is valued at \$60,000.

Mr. D. M. Meeker has long been prominent in all movements for extending the fame of Newark as a great manufacturing centre.

W. L. CHASE & CO., 7 Alling-street; salesroom, 93 to 97 Liberty-street, New York. This manufactory was established in 1872, and its productions consist of Woodman's screw cutting foot lathe, slide rests and lathe fittings. This is an improved foot lathe, and is the product of Mr. E. F. Woodman's designs and improvements in lathe machinery. Mr. Woodman superintends the manufactory, and the firm comprises himself and Mr. W. L. Chase. Ten hands are employed, and the weekly wages amount to \$100, the value of annual production being \$15,000.

ATLAS MANUFACTURING COMPANY, Passaic-street. The productions of this manufactory are wool and cotton machinery, and comprise cotton gins, wool pickers, and burring machines for cleaning cotton and wool. The business was established in Newark in 1862 by Parkhurst & Co. The members of the present firm, doing business under the above style, are Messrs. S. R. Parkhurst and W. H. Holt. A specialty is made of Parkhurst's patent single and double burring machines, with patent steel ring feed rollers. These machines, the valuable results of long experience and careful study, have been practically tested and are now used by the largest manufacturers and card builders. Another valuable invention of Mr. Parkhurst's, manufactured by the Atlas Company, is a double cylinder burring picker, for picking, burring and dusting all grades and qualities of wool. This manufactory illustrates what a wide range of production is covered by the industries of Newark. The Atlas Companay has only one competitor in its special line in the country. Its productions are sold generally throughout the United States wherever cotton and woolen mills are in operation. The working force numbers 30 hands, and the weekly wages are \$600. The annual productions are valued at \$75,000.

HAWKINS & DODGE, 52 to 56 Morris and Essex Railroad Avenue. This firm began business as engineers and machinists in 1866. Mr. Wm. Hawkins had been for several years previous, foreman of Hewes & Phillips' extensive machine works, and was then, as now, considered a first-class mechanic, familiar with all the details of 100 working and the construction of machines. Mr. William Foster Dodge, at the close of the late war, after honorable service in the Union army, held several patents of importance to the manufacturing interests of the country. Under these favorable auspices the two gentlemen united their interests, and laid the foundation for the present business, in a small building connected with the malleable iron foundry at 28 Orange-street. Two years later, through energy, skill and careful management, the business had so increased that the quarters named were inadequate. At this time, to secure greater producing facilities, they purchased the property at their present location.

They are representative men, Mr. Hawkins being everywhere acknowledged as an adept in the line of mechanics, while the other member of the firm is known to be fully informed in the careful management of an extensive business. Through application and perseverance, prosperity has crowned their efforts, and the firm of Hawkins & Dodge enjoys high credit and an enviable reputation.

They manufacture general machinery of almost every kind, and are prepared to fill all orders that may be received, having facilities for producing both light and heavy work. They hold the exclusive right to manufacture several wood working machines, among which are Hall's Patent Mitre for cutting door mouldings, Crosby's blind wiring machine, etc. A specialty is made of steam engines and shafting. The average working force is 20 hands, the weekly wages \$250, and the annual production is valued at \$40,000.

W. T. CRANE & CO. (Newark Bolt Works), 142 Mulberry-street. The members of this firm are Messrs. Walter T. and Francis E. S. Crane and A. C. Wheaton. Carriage, spring, tire and harness bolts are made, and the goods are sold to jobbers. Twenty men are employed in the factory, and the weekly wages are \$250. The yearly production of bolts is valued at \$70,000.

EZRA GOULD, 97 to 113 N. J. R. R. Avenue. The tool and machinery manufactory now widely known under the above name was first established by the present proprietor in 1835, and at that time a shop 12x16 feet in size afforded sufficient manufacturing facilities, it being the second machine shop started in Newark. This restricted condition of things, however, did not long continue. The business rapidly increased, and soon afterward the Gould Machine Company was organized. This company was succeeded by a series of firms, but the works are now under the sole proprietorship of the original founder, Mr. Ezra Gould, who has been closely identified with the business

from its inception. The works are located on Railroad Avenue, Green and Lafayette streets, on the line of the Pennsylvania and New Jersey Central Railways, thus affording first-class transportation facilities. They consist of the machine shop, iron and brass foundry, and pattern shop, with auxiliary buildings.

The productions comprise a great variety of machinists' tools, over 200 different patterns being made; also, tools for jewelers, tinsmiths, and metal workers. The machine tools manufactured are distinguished for their simplicity and originality of construction. The first compound plane, or shaping machine, ever made in this country was designed and built at these works, and many other machines now in extensive use owe their paternity to the mechanical and inventive genius of the founder. The productions also include general machine work, wood working machinery, iron and brass castings, etc. As already indicated, Mr. Ezra Gould, through his inventive skill and rare energy, has greatly contributed to the fame of Newark as an industrial centre. The reputation of Gould's tools and machinery and that of Newark are inseparable, each contributes to the other.

The products of these works are sold throughout the United States, and are largely exported to England, France, Germany, Cuba and Mexico. In this is found another illustration of the aid extended to European manufacturers by the skill of American mechanics.

The force employed in the works numbers 150 men, and their weekly wages are \$1,500. The yearly production of tools and machinery amounts to \$150,000.

SAMUEL HALL'S SON & CO., 277 Passaic-street. This manufactory began operations in 1863 and is a branch of the long-established and well-known iron house doing business under the above style, at 229 West Tenth-street, New York. The productions of the factory in this city consist of "Doyle's Patent Differential Pulley Blocks," with Hall's patent improved yokes. This is one of the most valuable inventions of the age. Too much cannot be said of its merits as compared with the ordinary pulley block. An endless chain is used in its construction, and the principal advantage of the differential block is the great increase of power; one man with it being able to raise 1,000 pounds with ease. A peculiar merit of the block is the invaluable quality of not "running down" when the load is in suspension. It is particularly valuable in lifting heavy weights; also, at machines, forges, stations, traveling and fixed cranes; and for hoisting stones, girders, timbers, etc. In fact, it may be used to great advantage wherever pulley blocks are in any way effective. The differential pulley is supported with Hall's patent improved yokes, which entirely obviate the vexatious twisting of the chain, which otherwise would be a considerable hinderance to the successful working of the pulley. The pulley blocks are portable, and can easily be carried from point to point and placed!"in

position for work. Special machinery made from the firm's own patents is used for straightening and equalizing the links of the chains. The Newark factory is entirely separate from the New York house. The working force numbers 15 men, and the weekly wages amount to \$350. The yearly production of differential pulleys is valued at \$20,000. Sales are made in all parts of the country, and largely to the United States government.

DRAKE & TOBIN, 15 Alling-street. This factory was established in 1868, and the firm is engaged in the manufacture of light machinery. A specialty is made of electrical machines. There are employed eight hands, to whom are paid \$100 weekly, and the value of annual productions is placed at \$10,000, which are mainly sold in New York markets.

SM1TH & SAYRE MANUFACTURING COMPANY, 46 Bridge-street; office, 95 Liberty-street, New York. This manufactory was established in 1863 and its productions consist of appurtenances for gas works and foundries. The Company is organized under the general laws of New York, and its officers are as follows: President, George T. Porter; Secretary, Charles W. Isbell; Treasurer, James M. Sayre; Engineer, P. W. Mackenzie. The Superintendent of the works in this city is Mr. W. W. Williams.

The business is rapidly increasing, especially in the productions of the various appliances for the manufacture of gas. They consist of Isbell's patent gas and water stop valves, and Mackenzie's patent gas exhauster and condenser; also, compensators, governors, and automatic bye-passes, pressure and vacuum gauges, and valves, pipes, etc., for exhaust room. These inventions are used in nearly all the principal gas works of the country and are considered the best in the world. They are nearly all made under patents owned by the Company. At the present time a great interest is felt in gas circles concerning the production of the most economical machinery for the manufacture of gas. The Smith & Sayre Company are now perfecting improved appliances for securing these desired results. The improved Mackenzie blower and cupola for smelting furnaces, or for use in foundries, manufactured by this Company are endorsed by American iron manufacturers generally. The productions of the Smith & Sayre Manufacturing Company find a market in all parts of the country, including California, Oregon and Texas, and also in the British Provinces. The works in this city give employment to 75 men, and the weekly pay roll is \$1,000. The yearly production of goods is valued at \$200,000.

AMOS H. SEARFOSS, 362 Bank-street. Prominent among the many important patents contributed to the industries of the country may be mentioned the "Searfoss Vertical Portable Grinding Mill," the result of the inventive skill of Mr. A. H. Searfoss. This, like most of Newark's contributions to the patent list, is considered a valuable invention in the fullest sense of the term,



and fills a want long felt for a portable grinding mill, which is equally well adapted to the grinding of all kinds of grain, spices, salts, earths, etc., and on this account has been deemed worthy of insertion in this volume. These mills, except the grinding medium, which is French burr stone, are made of iron, simple in construction, and free from all liability to disarrangement. Their operation requires no practical skill, and are considered by the most competent judges to have no superior, and it is a question, indeed, if their equal has ever been made. It is justly claimed for the mill that it gives the greatest amount of product for the power used, and they are undoubtedly destined to come into universal use, particularly for grinding feed on the extensive Western stock farms. By this valuable invention Mr. Searfoss has added another page in the history of Newark's fame as a centre of mechanical skill.

A. ALEX. POOL & CO., 55 & 57 N. J. R. R. Avenue. This firm manufactures light machinery, tools, electrical and telegraph instruments. They commenced business in 1873 and at present employ four hands, whose weekly wages are \$70. This house, although recently started, gives promise of keeping pace with all the requirements of the machinery line, the firm being thoroughly practical mechanics. In addition to the regular business a specialty is made of Pool's patent telescopic kaliedescope, used for parlor amusement or designing. The value of annual productions could not be determined owing to the recent date of establishment.

F. W. OFELDT & CO. (Star Gas Machine Co.), 146 Market-street. Many efforts more or less successful have been made to manufacture illuminating gas at less cost than the usual coal gas. In this direction, as in most others, Newark has fairly succeeded, the inventor being Mr. F. W. Ofeldt, whose Star Gas Machine is an acknowledged success. This machine was patented in 1872. The company which is to manufacture it is not yet fully organized, the factory being meanwhile under the direction of F. W. Ofeldt & Co. The main difficulty with previous gas machines has been their tendency to explode; not so, however, with the "Star," which has been fully tested by various Boards of fire underwriters, and has their full approval. It occupies but a small space, and is not affected by the weather. The gas produced gives a very brilliant light, its cost being comparatively nominal. The invention is meeting with universal favor. Six workmen are employed in the manufactory, with a weekly pay roll of \$100. During 1873 the value of the machines made was \$10,000, though the production for the present year will be largely increased.

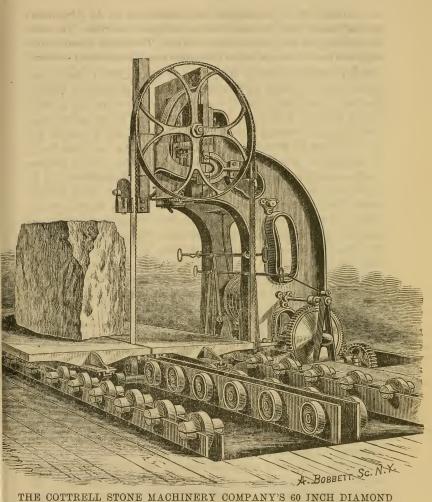
GEORGE E. HART, 318 Market-street. The productions of this manufactory comprise a general variety of light machinery, a specialty being watch-making machines. Although only established in 1873, Mr. Hart is rapidly building up an extended business. Sales are made in all parts of the country

and Canada. He is the patentee and manufacturer of the "Sportman's Favorite" metallic shell for breech-loading shot guns and rifles. Ten hands are employed, and their weekly wages are \$125. The factory was so recently established that the value of annual productions cannot be accurately estimated.

THE COTTRELL STONE MACHINERY COMPANY, 15 Bank-street. Another industrial triumph for Newark has been the perfection of improved stone-cutting machinery, which is destined to work a revolution in all kinds of stone working. This wonderful machine, illustrated on the opposite page, is the invention of Herbert Cottrell, who had previously been a practical jeweler. It was left for Mr. Cottrell to fully realize how little had been done in the application of steam machinery to cutting and shaping stone for purposes of architecture and general ornament. Appreciating the importance of a device, whereby the slow and laborious processes necessary to reduce the large blocks of granite, marble, or other building material, to the requisite size and shape, could be so far removed as to render stone cutting at once rapid, and comparatively inexpensive, and at the same time fully satisfy the demands of elaborate architecture and ornamentation, he began, about twelve years since, to study and experiment that his ardent hopes might be practically realized. After carefully study, with the enthusiasm peculiar to inventive genius, he saw no obstacles in the way, which mechanical ingenuity could not fully surmount.

To insure success, he first examined all the stone-cutting apparatus then in use, and soon satisfied himself that steel or metal of any kind was entirely inadequate for the purpose named. He saw how the process of sawing stone with iron blades in connection with sand and water was slow, inaccurate, and expensive.

Mr. Cottrell's first step was to discover a substance sufficiently firm to wear away by friction the hardest flint or granite, without itself suffering by the contact. After various tests he discovered that the carbon or black diamond fulfilled the requisite merits, and that all stones, however compact, would yield before it. This learned, the most difficult part of his task was yet to be accomplished. The almost magical properties of the diamond had to be utilized, and to this end it became necessary to devise suitable machinery. Mr. Cottrell's inventive skill, however, was equal to the emergency. To narrate his several attempts and successes is unnecessary here. It is sufficient to know that after arduous labor he has brought to perfection a machine known as the Diamond Stone Band Saw, which will cut stone of any hardness, quite as readily as the ordinary saw separates wood. This wonderful machine, propelled by steam or other power, may be briefly described as a strong upright iron frame, provided with two, upper and lower pulleys, over which is carried a metalic band, not unlike an ordinary band-saw. On one edge of this band are affixed, at short intervals, small sections of steel, in which are set the dia-



THE COTTRELL STONE MACHINERY COMPANY'S 60 INCH DIAMOND BAND SAW.

mond cutting points. Nearly midway between the pulleys is a massive iron bed-frame, propelled on wheels, by an ingenious mechanism beneath, at variable rates of speed proportionate to varying degrees of hardness in the material to be sawed. The cutting motion is always downward, and the work is done by the friction, in rapid succession of the several diamond points in the face of the stone. Rapid execution is effected by the wonderful speed at which the band is run, thus securing almost an infinite number of scratches from the diamond points, whose cumulative effect is marvelous. Aided by a stream of water, the grit from the cut is carried out instantly. The rapid passage of this magical ribbon of steel, through a huge block of marble or granite, is a grand triumph of mechanical skill.

The work performed is always accurate, the result being perfect lines and smooth surfaces. To illustrate the rapid execution of the Cottrell saw, it is only necessary to state that the largest size will cut through Newark brown stone at the rate of 4,000 superficial inches per hour. Three sizes are made. The largest weighs about 18 tons, and carries a band 371 feet long, on which are from 250 to 450 diamonds. This machine will cut with ease through any thickness of stone less than five feet. The second in size has a band 28 feet long, and will cut blocks two feet thick, while the third size is used for small work. What is scarcely less wonderful, the two latter named will cut all manner of curves and scroll work, thus showing their great utility in ornamental architecture. Their importance can hardly be overrated. Nearly all the old methods of stone working will be disregarded, and thereby a vast amount of manual labor saved. Stone and marble workers freely admit that their future operations must conform to the controling influence of these wonder-working machines. While their cost is considerable, it is trivial compared with the work accomplished, and it is an admitted fact that the diamond cutting points will last for years, the truth being that their power of continuously resisting the disintegrating influence of the hardest flint has not been over-In addition to the black carbons, borts are also largely used, and they are imported by the company.

In addition to the diamond saw, Mr. Cottrell has two other inventions for working in stone. The first is a stone ornamenting machine, which is a perpendicular shaft, revolving very rapidly, and which terminates in a socket for receiving variously shaped tools, armed with the diamond points, so set, as to cut both vertically and horizontally at the same time. With this machine, any kind of stone may be ornamented as the fancy of the architect may require. The second is a stone polishing machine, which is the most perfect device yet invented for polishing level and irregular stone surfaces.

In 1873, for the purpose of realizing the benefits of Mr. Cottrell's inventions, a stock company was organized under the general laws of New York State, and afterwards chartered by special act of the New Jersey Legisla-

ture. The gentlemen composing the company are among the prominent citizens of Newark and New York. Its officers are as follows: President, James M. Allen; Vice-President, Henry H. Ward; Treasurer and Secretary, Horace P. Geary; Superintendent, Herbert Cottrell. The purpose of the Company is not to manufacture, but to perfect and still further develop the Cottrell inventions, that others may profit by the inestimable benefit thus conferred upon modern society.

STEAM BOILER MANUFACTORIES.

BURNET & LEONARD, 450 Ogden-street. In the manufacture of steam boilers but few firms occupy in the country so prominent a position as the above, owing to the excellence of their productions. The manufactory was established in 1857 by Perkins & Burnet. In 1867 Mr. Perkins retired, and Mr. W. H. Burnet, the present senior partner became associated with Mr. W. S. Leonard, when the above firm assumed its present title, since which time Burnet & Leonard have been well and favorably known among the leading manufacturers of Newark. They make boilers almost exclusively, which are sold throughout the United States and are exported to Cuba and Mexico. This firm also makes to order every variety of goods from boiler plate. Their manufactory is provided with the most approved machinery. They at present employ 25 hands, with a weekly pay roll of \$300. The value of annual productions is \$75,000.

L. J. LYONS & CO., 191 to 195 Commerce-street. In 1847 Mr. L. J. Lyons began business as a steam boiler maker. In 1868 Mr. Owen McCabe became associated with him, when the above firm assumed its present title. They manufacture steam boilers of all kinds, and everything that is made from boiler plate. So well known are the productions of the manufactory, that orders are filled from all parts of the United States. The business, however, is mainly confined to near-by markets. The present number of hands employed is 40, the weekly pay roll being \$450. The annual products are valued at \$100,000.

STEAM FIRE ENGINE MANUFACTORIES.

While the steam fire engine is of quite recent origin, various mechanica devices for extinguishing fires have existed for centuries. The first machines mentioned for this purpose were used at Augsburg in 1518. and were called "instruments for fires." A machine used at Nuremberg in 1657, is described as a barrel for the water, eight feet long and three feet in diameter, with a piston operated by 28 men. With this contrivance an inch stream of water was thrown a distance of 80 feet, and it was carried about on a sledge drawn by two horses. In 1684 the use of fire engines, primitive in design, has been recorded in Paris. The first leather hose was invented at Amsterdam in 1670. beginning of the eighteenth century the first engine provided with suction hose, pumps, and an air chamber, was used. Until the beginning of the present century little further improvement in the methods of extinguishing fires was made. The last machine before the successful application of steam consisted of two verticle double acting force pumps with an air chamber, and operated by brakes placed parallel with the engine, thus enabling many men to work unitedly. This machine, known as a hand engine, is still used in villages and smaller cities.

In 1829 John Braithwaite and John Ericsson, of London, made a steam fire engine—the first ever made. It worked with great success, without cessation for five hours, throwing a stream over the dome of the building, at the fire at the Argyle rooms, while the hand engines, owing to the intense cold, became frozen and useless; besides this, it rendered most valuable aid in extinguishing many large fires, among them the English opera house and Messrs. Barclay's brewery. Strange that notwithstanding its undoubted superiority over the hand engine, it met with great opposition from the London firemen, who did all in their power to annoy the workmen and prevent its working at fires. All the work done was gratuitous, and at a vast expense on the part of Mr. Braithwaite, for which he received but little patronage and support from the public. from the insurance companies who were benefited thousands of pounds, his men received the miserable pittance of a single sovereign. The managers of the Fire Brigade offered so little encouragement, and the members manifested so much opposition, that Mr. Braithwaite withdrew in disgust from a field in which he hoped to have profitably and usefully employed his talents and resources.

Several improvements followed this invention of Braithwaite's, but the fire engine as now known and perfected, has only been in use for the last fifteen or or twenty years, and as will be shown further on, the most efficient steam fire engines have very recently been introduced. At the present time scarcely any

branch of American industry brings to its aid higher inventive skill or greater energy. On account of the recent large and destructive fires in the metropolitan cities of the Union, an eager demand exists for the most improved engines possible, as a more complete protection against the ravages of fire. In the manufacture of the best steam fire engines, as in most other lines of production, Newark ranks first.

R. J. GOULD, 97 to 113 N. J. Railroad Avenue. The development of steam fire engines to the highest results at present accomplished, has been a great triumph of mechanical ingenuity and skill. Capital, although taking a prominent part in this development, has been unable to compete with inventive genius and ceaseless energy. These remarks have been suggested by an examination of the peculiar merits of the Gould steam fire engine, which is now manufactured by Mr. R. J. Gould, the successor of the Gould Machine Company. This gentleman has certainly been the pioneer in this branch of Newark's industries, and was the controlling mind of the business when directed by the above named Company.

After ardnous labors, a zeal which knew no failure, and a succession of minor triumphs, Mr. Gould has now the satisfaction of seeing his perfected invention regarded as the first of American steam fire engines. This fact is now quite beyond controversy, and is alike an honor to the inventor and the city wherein his wares are made.

These machines are known as Gould's Variable Pump Fire Engines. As a result of careful study for years, Mr. Gould has several patents, whose great importance is unquestionable. These improvements have greatly contributed to the supremacy of his engines. The variable pump consists of two pumps on the same piston rod, with a "churn valve" to shut one off, or render it inoperative, by which means all the power of the cylinder can be exerted on one pump when a long line of hose is required, or when desired a larger quantity of water can be discharged.

The boilers of the Gould engine are upright and tubular, and have a large capacity. Steam can be raised in from three to five minutes, and a working pressure easily maintained. The cylinders on the double engines are made in one casting, with one steam chest for both, and all parts of the engine are finished in the most perfect manner. The forward part of the engine is of the crane neck style, room being provided for the front wheels to pass under, in order that the engine may turn on its length. On some the forward axle is short or narrow tracked, thus making the fore part light, and rendering the engine more easily managed, which is a tremendous advantage, when dispatch in getting ready for action is the great desideratum. The rear is hung on substantial springs by braces secured firmly to the boiler above the centre of weight, thus preventing any tendency of the boiler to sway. The arch of the frame is sufficiently high to allow the engineer to pass through, and, when running,

all parts requiring his care and attention are within easy reach from his position. The Gould machines excel in convenience, and beauty of design and lightness. All the the material used is of the best quality, and no incompetent workmen are employed.

The double cylinder variable pump engine weighs about 6,500 pounds, is capable of discharging 1,000 gallons of water per minute, and has thrown a $1\frac{1}{2}$ inch stream 354 feet, which is the longest throw ever made by 34 feet. The advantage of the variable pump is seen in this: with the ordinary pump the proportion of steam to water cylinder always remains the same, although the requirements vary from a two inch stream and 50 feet of hose, to a $1\frac{1}{8}$ inch stream and 2.000 feet of hose.

Gould's machines are known as piston engines, and are made in four different sizes; and on account of the great satisfaction given, many of them are supplied with the variable pump.

Of late a great rivaly has sprung up between the different fire engines in competing for the western market. This competition is so active that only competitive trial-tests will satisfy the western public and purchasing Boards of Fire Commissioners. A bitter contest has recently been made in Chicago, and as usual the Gould engine is victorious at every point. On Sept. 5th of the present year, a public test was there made, and the verdicts of the Mayor, Common Council and press alike were in favor of the Gould machine. As a result of these triumphs, Mr. Gould will undoubtedly hereafter largely supply the western demand for the most approved fire engines.

Mr. Gould also manufactures leather and rubber hose, couplings, trucks, hose carts, and all apparatus connected with fine engines. Orders for engines are received from all parts of the country, showing how quick are buyers to appreciate genuine merit. In the works as now running, 40 of the most skillful workmen are employed, and the summary of weekly wages is \$800. The production for 1873 was valued at \$50,000, but it is now rapidly increasing.

MR. J. N. DENNISSON, 245 N. J. Railroad Avenue. The fame of Newark for producing the best steam fire engines has greatly increased by the valuable inventions of Mr. J. N. Dennisson, now engaged in their manufacture at the above location. The variable pump, which has added so much to the efficiency of steam fire engines, is of Mr. Dennisson's own invention. As this pump is used in the construction of his machines, they have no points of inferiority compared with the best fire engines made. Mr. Dennisson also has patents on several pumps of different sizes, all of which go to make up the excellence of his productions. His other patents are a concentric ring piston, and an improved hose rivet, which latter adds 20 per cent. to the strength of hose. Not content with these great improvements, Mr. Dennisson has invented and patented an air pump, with large and small cylinders, for compressing air. His machines are all made in the crane neck style, with hose carriages constructed

in a similar manner, and they are all light weight engines. They are capable of throwing the same quantity of water as engines weighing one-third more, and are so finely constructed as to permit of being run with or without fly wheels, and will not stop on the centre at any rate of speed. The piston pump is used, but with Mr. Dennisson's peculiar and superior manufacture, will not "jump" on the water any more than the rotary pump. It is only necessary to say that his productions have all the requisites of first-class machines. They are sold in the largest cities of the Union, and meet with general approval. In a word, with light weight and easy running qualities, the Dennisson engine has all the powers and capabilities of the heavier machines made by other manufacturers, and the public may rest assured that it will keep pace in added improvements with the demands of the times.

The crane neck hose carriages of this manufactory are provided with a patent brake, managed by the driver, on the hose reel. Mr. Dennisson supplies with his engines the best qualities of leather and rubber hose, and also a general line of fire engine supplies. He employs at present 10 hands, the weekly pay-roll being \$150. The annual production amounts in value to \$30,000.

SMOOTHING IRON MANUFACTORY.

BLESS & DRAKE, 173 N. J. Railroad Avenue. This firm is mainly engaged in the manufacture of the celebrated self-heating smoothing irons. This iron is a miniature stove with a polished surface, as in the common flat iron, and is used in the same manner. It is heated with charcoal, or live coals from a hard wood fire, and on account of its extraordinary merits is already in general use. It was first patented about 1852, and in that year its manufacture was begun by the patentees, under the firm name of Taliaferro, Cummings & Bless. The firm was changed, however, and in 1854 the present style was adopted. The members of the present firm are Messrs. J. F. Bless and Robert Drake. Through their business energy the self-heating smoothing iron has been perfected and its merits brought before the country. As a result the business has rapidly increased, and their manufactory is now one of the most prominent in Newark. A special feature of the business is the large exporting demand for these irons. They are extensively sold in South America, the Sandwich Islands, and other foreign countries. The trade with South America in the self-heating iron and also the common sad iron, is an interesting feature in the exports of this country. American skill is fast driving English irons from the South American market. The self-heating smoothing irons are now made in England, owing to the expiration of the patents granted there.

The smoothing iron manufactory of Messrs. Bless & Drake is the only one in this country, and their invention has not even been successfully imitated.

They also manufacture extra sad irons and tailors' common geese, and in fact a complete line of laundry machinery. They are perhaps the largest manufacturers of sad irons in the United States. These irons are cast in an iron mould by a peculiar process, and the results of this method are equal to the best case hardened iron or even steel. The productions of the factory are nearly four tons of irons per day. Sixty hands are employed, and the weekly pay-roll is \$700. The annual production amounts in value to \$100,000.

FILE MANUFACTORIES.

Prior to 1840 the manufacture of files was unknown in the United States. Since that date the production has rapidly increased, until now a large part of the files consumed in this country is the product of American manufactories. As yet file making machinery has not been extensively introduced, as the result of hand work is usually considered a superior article. The business of file manufacturing has been carried on in Newark for many years. Nothing, however, is done in the way of machine cutting, all files made being hand-cut. Newark files are well known to the trade, and their excellence is acknowledged.

HELLER & BROTHERS, Montclair R. R. and Summer Avenues. This well known file manufactory was established in 1865, under the present style, and to-day the productions of no firm in the same line of business are so celebrated as the American files and rasps made by Heller & Brothers. Their goods are sold from Maine to California and are also largely exported. These files and rasps have become so well known on account of their superior quality, that the name of "Heller" is regarded by all purchasers of files as a sufficient guarantee. On this account inferior goods have been thrust on the market in imitation of the "Heller" brand. The spurious article, however, may be easily detected by examining the brand, which in the genuine reads "Heller Rasp," while the imitation is stamped "Heller's Rasp." Their goods are sold by all first-class jobbing houses, and the firm has one of the most extended trades in the country. The demand has so increased that during the present year they have been obliged to erect a larger factory with greatly increased manufacturing facilities. The well-known specialty of the firm is the "celebrated American horse rasp." The working force of the factory is 50 hands, the weekly wages are \$350. For 1873 the productions amounted to \$50,000, but for this year will undoubtedly be much greater.

JOHN RAY & COMPANY, 68 Railroad Avenue. This is one of the oldest manufactories in Newark, having been established in 1843, by the firm of Downes & Wilson. Afterwards Mr. C. V. Wilson became sole proprietor. It was thus one of the first attempts at the manufacture of files in the United States. In the office of the factory may be seen a diploma issued to C. V. Wilson by the American Institute in 1843, for the best American files. Mr. Wilson died in 1872 and his successors are Messrs. John Ray and Joseph E. Haynes, doing business under the above style. They manufacture all styles of handcut files and rasps, and in addition do an extensive business in re-cutting. Their files have an acknowledged reputation for the quality of material used and excellence of manufacture. Sales are mainly to the trade, and are mainly made in the Eastern markets. The force employed numbers 18 men, and the weekly wages are \$230. The files annually produced are valued at \$25,000.

RAE & McKECHNIE, 56 Elm-street. This file manufactory was established in 1871 under the above style. The members of the present firm are Messrs. W. Rae and J. McKechnie. They are young men, and bring to their business the best of capital, manufacturing skill and energy. They manufacture all styles of hand-cut files and rasps, and also do re-cutting. Their trade is mostly in the East, and sales are mainly made direct to manufacturers. Eight hands are employed, and the weekly pay roll is \$110. The yearly product of files amounts to \$8,000.

JOHN Y. JOHNSON, Railroad Place and Commercial-street. Mr. Johnson began the business of manufacturing hand-cut files and rasps in 1868 at Ossining, N. Y. To secure better manufacturing facilities he removed to Newark in 1870. The business is confined to producing the better qualities, and all styles of files and rasps. The policy pursued has been to make only good articles, trusting to this method as a means of securing a good reputation as a manufacturer and an extended trade. The result has justified the course pursued, and Mr. Johnson is gradually but surely building up a valuable business. In addition to manufacturing, re-cutting of files is done in the best manner. Sales are made both to consumers and the trade. The manufactory gives employment to 15 hands, and the weekly wages are \$125. The yearly production of files is valued at \$15,000.

IRON SAFE MANUFACTORY.

JOHN A. HORSCHEL, 13 Hedenberg Works. Mr. Horschel began in Newark the manufacture of fire and burglar proof safes in 1868. It is the only safe manufactory in New Jersey. His workmanship is well known throughout the country, and the safes made by him are guaranteed to be fire proof and free from dampness. Twenty different sizes are made. Three workmen are now employed in the factory, being paid weekly \$50, and the annual production is valued at \$20,000.

IRON RAILING MANUFACTORIES.

EDWARDS & SMITH, 53 to 57 N. J. Railroad Avenue. The manufactory now known under the above style was established by Cyrus Edwards in 1842 and is thus one of the oldest iron foundries in Newark. In 1869 Mr. Albert Smith became his associate in business, when the present firm name was adopted. Their works are known as the principal iron railing manufactory in Newark. The productions consist of iron railing, iron columns, book safes, doors, shutters, monumental railing, etc. They also manufacture all kinds of castings for French roofs, iron furniture for lawns, and furnish to order Hyatt's patent sidewalk lights. The working force of the factory is 25 hands, and the weekly pay roll amounts to \$375. The total yearly productions consisting of iron work, railing, etc., amounts to \$55,000.

THOMAS BURNS, 201 and 203 Commerce-street. The Burns Iron Works were established in 1869 by Mr. Thomas Burns, who may be considered as thoroughly practical in iron working, having been engaged in the business from boyhood. There are manufactured at these works iron railings, coverings for areas, glass grating and all kinds of iron for building purposes. The factory gives employment at present to 12 workmen, with a weekly pay roll of \$175. The value of annual productions being \$30,000.

JOHN ELY (New Jersey Iron Railing Works), 117 and 119 Mulberry-street. This manufactory was established in 1845. Its productions are iron railings, doors, shutters, castings, gratings and bedsteads. Mr. Ely has been sole proprietor since 1870. Fifteen hands are employed, and the weekly wages are \$200. The annual productions are valued at \$20,000.

SADDLERY HARDWARE MANUFACTORIES

Few people not familiar with the details of the business have an adequate idea of the nature and extent of the saddlery hardware trade as it exists in this country to-day. It has, as now distinctly known, long been an interesting and important specialty. The number of articles which go to make up the trade is immense, the mere enumeration of which would make a small volume. Within the last decade the business has reached large proportions indeed, as no single branch of the general hardware trade surpasses it in importance. It involves a very large amount of capital, and engages the labor of great numbers of men, while as a means of increasing and distributing wealth it is exceedingly prominent.

During the last ten or twelve years, owing to the tastes and demands of consumers, various and far-reaching changes have occurred in this branch of industry. Before the war the varieties of saddlery hardware and trimmings, necessary to meet the requirements of public taste, were comparatively plain, and mainly devoid of artistic design and finish. At present the demands of the trade are largely in the direction of elaborately designed, highly finished and expensive articles. On this account the capital required to successfully carry on the business of manufacturing saddlery hardware is necessarily much greater than in former years.

At present nearly all the saddlery hardware required in this country is the product of home industry. Some of the more common varieties are imported, on account of their cheapness, and in the opposite direction a superior quality of bits are brought from England. The importing trade, however, is rapidly decreasing, and will soon cease altogether. In fact it is highly probable that the United States will soon have a large exporting trade in saddlery hardware. It seems only necessary for manufacturers to become more familiar with the wants of South America and other countries in this direction to bring about the desired result. The skill and energy necessary as elements of success are fortunately not wanting.

The city of Newark has long been prominent in the manufacture of saddlery hardware, and to-day its productions in this direction exceed those of any other American city. In this respect, as in other lines of production, Newark excells in the high quality of the goods produced. The cheapest grades of saddlery hardware are in a great measure the product of New England factories. Among the Newark manufacturers in this line are those who have done most in bringing to perfection the best processes of manufacture. Through their

skill and energy the tastes and requirements of the country have been fully met. Newark is indebted to these men, who, by their earnest efforts and patient toil, have given her an enviable position as a great emporium for saddlery hardware goods.

JOS. BALDWIN & COMPANY, 254 Market-street. The manufacture of saddlery hardware was begun by this house in 1846. Business has been conducted under the present style since 1863, and the firm consists of Messrs. A. P. Baldwin and D. Martin. They manufacture saddlery hardware in general, but their great specialty is hand-forged goods, and they are the first firm in Newark making this class of work. Their efforts in producing the best products of American ingenuity and skill have mainly been confined to the manufacture of fine wrought bits of various styles and patents.

Heretofore many have thought that the best quality of hand-forged bits has been imported from England, and chiefly known as the "Daniels" bit. This reputed superiority is now, however, fast disappearing. American bit makers are rapidly acquiring a reputation that will soon crowd all foreign bits out of the home market. Until recently the cost of hand-forged bits has been such as to prevent competition on account of price, but this is in a great measure overcome, and a genuine forged bit of American manufacture costs no more than the same quality of English make. This result is largely due to the earnest efforts of Messrs. Joseph Baldwin & Co. Their stamp is a guarantee of superior quality, and their bits are preferred by many horsemen to the "Daniels." A specialty of the firm is the celebrated "Baldwin bit," of their own design, together with other original styles and patents. Patent bits are made on a royalty, and wrought bits are manufactured to order. The firm is well known for its successful efforts in supplying the Mexican, Cuban and South American markets, in the face of foreign competition. They were the originators of the Mexican spur trade in this country. Goods are all warranted, and their sale extends over the whole country and largely in California, together with extensive exports to the countries named. The manufactory gives employment to 30 workmen, and the weekly pay roll is \$450; the annual sales amounting to \$50,000

AUGUST BUERMAN, 83 and 85 Hamilton-street. This factory was established in 1864. Mr. Buerman manufactures a great variety of saddlery hardware but makes a specialty of bits and spurs. Goods are mainly sold to jobbers in the New York market. Ten hands are employed in the factory, and the weekly wages are \$125. The yearly production amounts to \$15,000.

BAYLEY & COMPANY, 82 Mechanic-street The productions of this manufactory are confined exclusively to the finest grades of saddlery hardware. No cheap goods are made. The wares produced consist of gold and silver lined and leather-covered goods of the best quality, including cut monograms,

old English, block and cypher letters, fancy horse fronts and ornaments. The business was begun in 1862, and has been conducted under the present style during the past year. The members of the firm are Messrs. George W. Bayley and Thomas Briggs. Goods are sold to the trade generally and largely in New York. Fourteen hands are employed, and the wages paid weekly amount to \$125. The annual production is valued at \$15,000.

CRANE & COMPANY, 72 to 76 Mechanic-street. Pioneers there are in every branch of industry, but the honor of developing the manufacture of saddlery hardware in this country belongs in a great measure to the firm named above. Under successive styles it has been engaged in manufacturing saddlery hardware for a period of 40 years. The business was first established by Alfred Edwards, who was succeeded by the firm of Edwards & Frazee, and the style was afterwards changed to James M. Frazee & Co.; next in order was the Condict & Wheeler Saddlery Hardware Co., which was succeeded in 1872 by the Messrs. Crane & Co., consisting of Jason, Edward N. and Frederick Crane. The second named gentleman has been associated with the business during the last decade.

This firm, like most others, has given its attention to the development of special lines of production. They make a specialty of buckles, bits, hames, and fine harness mountings. Of the first named, Messrs. Crane & Co. make all grades, from the cheapest malleable iron and japanned, to the more expensive X C plate, and silver, nickel and gold plated goods, comprising the most elaborate and highly finished buckles known to the trade. In this particular, the manufacture of fine buckles, the firm is in advance of other houses. In bits the production is fairly complete, consisting of common malleable bits, and a full line of the more desirable wrought bits. The two principal points in the country for the manufacture of iron hames, are Pittsburg, Pa., and Newark. The latter city is thus placed in direct competition with the chief iron producing city on the continent; she has, however, been able to hold her own in this direction, and this result has been largely due to the efforts of Messrs. Crane & Co. They also have a merited reputation in the manufacture of fine harness mountings in nickel, silver and gold. An interesting feature in the manufacture of composition or oroide mountings, is that the copper for producing them is received at the factory in the ingot, and then combined with other metals in the firm's own foundry. Thus faithful work, resulting in the best qualities of goods, is assured. This is generally true of the firm's method of manufacture; the material is brought to the factory in the rough, and then transformed into articles of use and beauty.

Messrs. Crane & Co. use a great amount of labor-saving machinery, and in this direction they surpass most saddlery hardware houses. Many of the machines are of their own designs, and some of the most valuable were made in the factory, thus being in a great measure independent of outside assistance. Machines made outside are frequently improved and perfected in the factory. In this way has the firm been able to do much toward developing the production of saddlery hardware to the point of successful competition with European manufactories, and they are now enabled to reduce the cost of production to a minimum, thereby benefitting the consumer with low prices.

The factory in Mechanic-street is very extensive, occupying an extensive four-story and basement building. In the basement is the forging department, where are many of the labor-saving machines mentioned. The first floor is used for the Company's offices and salesrooms, where a large stock of goods is constantly kept in store. In the upper stories are the foundry, general manufacturing and finishing rooms.

The present working force is about 90 hands, and the weekly wages are \$850. The great amount of machinery in operation reduces the expenditure in this direction. The annual production is upwards of \$100,000. The goods are sold in all parts of the country and occasionally sales are made in foreign markets.

R. M. GRUMMON, 13 Mechanic-street. The saddlery and coach hardware manufactory known under the above style was established in 1847, and is therefore among the oldest in Newark. Mr. Grummon manufactures fine coach, carriage, hearse and saddlery hardware. The goods are of superior quality and made from his own designs, the production of patterns for the same constituting a separate branch of the business. He keeps in stock a full supply of mountings in every style, quality and price. A specialty is made of E. E. and nickelized silver mountings, also a patent combination carriage prop and patent ball fly terrets, the two last named being Mr. Grummon's own invention and patented by him. The markets for these goods extend to all parts of the country, including California. The factory gives employment to 40 men, and they are paid weekly \$450. The annual production amounts to \$65,000

KUEHNHOLD & WRIGHT, 303 and 305 N. J. Railroad Avenue. This manufactory was established in 1866 and its productions comprise English steel, gold and silver-plated bits, nickel and silver-plated buckles and hames, together with a general variety of saddlery hardware. This firm has rapidly risen into the front rank of manufactures in their special line, and recently, owing to the increase of business, they were compelled to greatly enlarge their producing facilities. Messrs. Kuehnhold and Wright have been prominent in perfecting the American manufacture of saddlery hardware in order to successfully compete with the foreign producers in the better grades of goods. They have done much to introduce American hand-wrought bits of their own manufacture in preference to the English article. The goods of the firm are sold to jobbers from Maine to California. The manufactory gives employment to 75 hands, and their weekly wages are \$800. The aggregate value of annual production is \$85,000.

H. C. MAXWELL & CO., 28 Mechanic-street. This firm began business during the present year, and it is rapidly growing into one of Newark's prominent saddlery hardware manufactories. The members of the firm are Messrs. H. C. Maxwell, B. J. Osborn, W. L. David and John Theobold. The productions comprise a general line of saddlery hardware, consisting of fine and medium grades. A specialty is made in the manufacture of gig saddles. Goods are sold to the trade in all parts of the Union. The working force of the factory numbers 39 hands and the weekly pay-roll is \$350. Although recently started the productions for this year will probably reach \$75,000.

SARGEANT MANUFACTURING COMPANY, 75 to 79 Summit-street. This company is prominently known in the manufacture of saddlery hardware. It was established in 1869 under the general laws of New York, and its officers are as follows: President, C. H. Pond; Secretary and Treasurer, S. S. Sargeant; Superintendent, A. V. Sargeant.

Like various other similar efforts in the line of industrial pursuits, the Company was organized for the purpose of giving practical utility to a valuable invention in saddlery hardware, known as Coles' wedge-tongue trace buckle. This buckle, whose great practical value in harness making is now everywhere acknowledged, had in 1869 been before the public for only a short time. Mr. A. V. Sargeant having secured from the patentee the exclusive right to make the Cole buckle, began its manufacture in Syracuse, N. Y., under the style of Harrell & Sargeant. 'The firm, however, soon dissolved, with the privilege named in the control of Mr. Sargeant. The importance of the invention being well known, efforts were at once made which resulted in the organization of the Sargeant Manufacturing Company as above, and the manufacture of the buckle was begun in Newark. The first efforts were modest in their way and were confined to the production of the buckle named. Its merits, however, were so great that in this direction alone a large business soon sprang up. In fact, the Cole buckle soon became so popular that many inventions, ostensibly original, were really infringements on the original patent result was extensive litigation, but the Sargeant Manufacturing Company succeeded in maintaining their position at every point. The Company therefore control the patents and license the manufacture of competing buckles, which are known as the "Kinne," "Thornton," "Columbus," and "Eureka."

In 1871 the Sargeant Company began manufacturing a general line of saddlery hardware, the productions being at first confined to various styles of plain japanned goods. Additions were continually made, however, and now their productions comprise every variety of fine goods known to the trade. Among the many specialties may be mentioned harness trimmings made of iron in almost exact imitation of the leather covered article. Another specialty is the "Novelty" patent gig tree, well and favorably known to the trade. A full line of coach trimmings and mountings is also made.

An important element in the success of this Company has been the inventive skill of the Superintendent, Mr. A. V. Sargeant. His intimate knowledge of the business is so widely known and appreciated, that the patentees of any new invention in saddlery hardware are solicitous to have the Sargeant Company manufacture the article, that advantage may be derived from Mr. Sargeant's improving skill. The motto of the Company has constantly been, "Whatever is worth doing at all, is worth doing well." All goods are made in the best manner and to insure perfection all articles produced are carefully inspected by the Superintendent.

As an inevitable result of these efforts the business increased so rapidly that in 1872, to secure better manufacturing facilities, the factory now occupied was built. It is remarkable for convenient arrangement, which is the result of original plans by Mr. A. V. Sargeant. In 1871 the productions of the Sargeant Company amounted to \$70,000; the following year they were \$90,000; and in 1873, notwithstanding the financial depression, there was a notable increase, the product for that year being \$100,000. It is probable that for 1874 the business will be still greater, as the prospects were never brighter than at present. The force of the factory numbers 80 workmen, and their weekly pay-roll is \$1,000. The goods are mainly sold in the western markets, though extensive sales are made in New York and New England.

- W. L. STARR & CO., 44 Lawrence-street. This manufactory was established thirty years ago by Mr. W. L. Starr, and the business has been conducted under the present style since 1870. Its products comprise the general varieties of saddlery hardware, a specialty being a fine quality of silver, X C, nickle, and gold plated buckles. Goods are sold to the trade exclusively, and the market extends throughout the country. Sixty hands are employed, and the weekly pay-roll amounts to \$700. The total annual production of saddlery hardware is valued at \$75,000.
- G. & T. SIMONSON, 217 Halsey-street. This factory was started in 1866, and the productions consist of saddlery hardware in general. Sales are made to the trade, and mostly in New York and New Jersey. Six hands are employed, and the weekly wages paid are \$90. The goods annually produced amount in value to \$10,000.
- S. G. STURGES, SON & CO., 61 and 63 Mulberry-street. This firm which is the oldest saddlery hardware house in Newark if not in the country, has been in existence since 1835, and was first started under the style of G. Van Antwerp & Company. It was soon changed, however, to Sturges, Wade and Dawson, and in 1859 became S. G. Sturges & Son. The business was thus conducted until 1872 when Mr. J. K. Dodd was admitted as a partner and the present style adopted. During the entire time the business has been under the direct control of the senior partner S. G. Sturges. Now however, in his declining

years after nearly four decades of honorable industry, its management is gradually devolving on the son Mr. William E. Sturges and his associate Mr. Dodd.

The history of this firm, extending as it has through a period of over forty years, is perhaps more closely interwoven than that of any other house, with those industries whose growth and development this volume records. When the firm was founded American manufactures were in their infancy; at that time the products of European workshops fairly monopolized the home market. Far more than the average skill and business energy were necessary in order to successfully establish a new branch of industry, under such adverse circumstances. These, however, in its controlling mind, the firm had, and, hence, to their efforts the manufacture of saddlery hardware in the United States is greatly indebted. They were pioneers, and have continually remained such in the introduction of new and improved designs, and the best methods of manufacture. As early as 1835, a silver medal was awarded to them for the best plated bridle, bit and stirups. They were the first to manufacture buckles to any extent in this country, and to-day have acknowledged precedence in the same line as regards the quality and extent of manufacture. A very large portion of their work is done by the most improved machines, which have generally been built by themselves. While saving much manual labor, these valuable inventions insure perfect work in every respect. The goods produced greatly vary in quality, ranging from the plainest to the most highly finished buckles in the market. Every desired pattern can be found, and all of the most thorough workmanship. The firm also excels in manufacturing the most approved styles of hames. In addition to these specialties, their general line of saddlery hardware is everywhere regarded as having no superior in quality and style. Their manufactory is among the largest in the country. and this could not well be otherwise, having had for so long a time the same direction in guiding its interests and developing its resources.

The trade of Messrs. Sturges, Son & Company extends to every large city in the United States and Canada. They also have an exceptional thing in the saddlery hardware business, an exporting trade with South America. The present working force of the factory numbers 100 hands, and the weekly pay roll amounts to \$600. The value of annual productions reaches \$150,000.

SAMUEL E. TOMPKINS & CO., 50 to 56 Mechanic-street; principal warehouse 79 Beekman-street, New York. Attention has already been called, in this volume, to the great stimulus and development afforded many branches of industry by Newark manufacturers. It has been shown how many important manufactures have had their very birth and continuous growth at this centre of American industry. While the manufacture of saddlery hardware dates from no single invention or discovery, its present great prominence is mainly due to the inventive skill and perseverance of a few men, who had sufficient foresight to appreciate the increasing wants of modern society. No man has done more,

in the direction indicated, than the inventor of Tompkins patent gig tree, Mr. Samuel E. Tompkins, who founded the firm named above in 1855. The beginning was small, but it is now, perhaps, the largest house in the country exclusively engaged in the manufacture of saddlery hardware. They are unlike many other houses in the same line who combine the manufacture of coach and carriage mountings with saddlery goods. More fortunate than many inventors, Mr. Tompkins had little difficulty in the introduction of his improved "trees"; their merits were so great as to completely negative all adverse criticism. This, combined with the inventor's confidence and ability to surmount all obstacles, was sufficient, and the perfected tree was in a short time generally adopted by the trade. To-day the name of "Tompkins" is a familiar word in this country wherever saddlery hardware is used. Several imitations of his "trees" have been offered to the trade, but they have invariably been based on the peculiarities of the original invention. By the introduction of these "trees" a complete revolution was wrought in the manufacture of gig saddles, resulting in a like development in all kinds of trimmings used in the manufacture of harness.

The business prospered as established by Mr. Tompkins, and in the spring of 1864, Mr. Peter Hayden, who is everywhere known and respected in the saddlery hardware trade, became interested with him, and since then the firm has been known as one of the chain of Hayden houses which are established in nearly all the large cities of the Union. The capital and influence thus united to the genius and energy of the inventor, instilled a new life into the business, and since then its growth has been still more rapid.

While the factory and salesroom in Newark are very extensive, the principal manufactory is located at Ossining, N. Y., on the Hudson River. Their New York warehouse under the name of Hayden & Tompkins is a commodious building of five stories and a basement, entirely occupied by the firm. The business was first started in this city, where are manufactured the finer grades of goods, such as very fine gig saddles, Tompkins covered trees, etc. A specialty is also made of fine harness mountings consisting of the best silver plated, gilt, nickel and leather covered goods.

Great order and regularity pervade all departments of the factory. A perfect system of checks and balances has been instituted.. Only in this way is a maximum result obtained, with a minimum amount of labor. These desirable results are, to a considerable extent, due to the executive ability of Mr. John M. Gwinnell, who has the immediate supervision of this branch of the business. This gentleman has been in their employ for the past fourteen years. Through industry and careful attention to the interests of the firm, he has risen from the work bench to his present responsible position. A marked feature of this firm's business as at present conducted, is the harmony and good will existing

between employers and employed. "Justice to all" is the firm's motto. That this is fully appreciated is shown by the few changes which occur in the working force. And in return for the courteous treatment received, the employees of the firm, from those in the office to the workmen at the bench, are noted for careful business habits and fidelity in mechanical operations. At the factory in this city 90 persons are employed, and the weekly pay roll is \$1,000. The annual production amounts in value to \$160,000.

This great firm, with its connections in all the large cities of the country, is in the fullest sense a representative institution. It has greatly contributed to the supremacy of American manufactures. Its history is a complete illustration of the great rewards which are the inevitable result of long years of honorable industry.

A. TEAS & COMPANY, 34 Mulberry-street. This firm manufactures as a specialty Teas' patent gig and express trees. This is entirely a new invention, and superior merits are claimed for it over anything yet introduced. The improvement consists in its peculiar shape, whereby greater ease in wear is secured. On this account it has received the favorable consideration and approval of the humane Society for the prevention of cruelty to animals. It is also so made that the gig saddle can be far easier adjusted to the tree. In fact, it has many advantages claimed for it, and is rapidly being favorably received by the trade. In addition to the gig and express trees, track or trotting trees are made, and with bridge if desired. The business is under the management of Mr. T. L. Rivers. The hands now employed in the factory number 18, and the weekly wages are \$120. The business has only been established since May of the present year, and on this account the annual production cannot be accurately determined, but it will doubtless be large.

CHAS. M. THEBERATH & BROTHER, 40 Mechanic-street. This firm began the manufacture of saddlery hardware in 1864 under the above style, and at present is composed of Messrs. Charles M. and Jacob H. Theberath. The productions consist of the better qualities of saddlery hardware, comprising fine qualities of leather covered, gold, silver and nickel plated, aluminum bronze, and solid German silver, oroide and brass goods. A specialty is the double-seam harness trimmings. Formerly this work was done with a single seam in the centre, but by the new patent mentioned, two seams are used, one on each edge, and by this means a higher finish and greater durability are secured. Messrs. Theberath & Brother have recently introduced new and attractive styles known as the "Grant" and "Bismarck" harness trimmings. They also manufacture Whelan's patent bit. Forty-five hands are employed, and the weekly pay roll is \$450. The goods produced yearly are valued at \$40,000. These goods are sold to the trade, and the market extends over the whole country, and sales are sometimes made to Canada and South America.

N. VAN NESS, 15 and 15½ Mechanic-street. This manufactory was established in 1845. Mr. Van Ness manufactures a general line of saddlery hardware, his productions, however, are mainly confined to the better grades. Goods are sold to the trade generally throughout the country. Twenty-five hands are employed, and the weekly pay roll is \$226. The aggregate amount of yearly sales is \$50,000.

WIENER & CO., 87 Mechanic-street. The saddlery hardware house doing business under the above style was established by Mr. S. Wiener in 1860, and is now, in its special field, one of the largest manufactories in the country. During 1863 the firm of Wiener & Company was formed by the admission of Mr. O. Wiener, and in 1868 Mr. J. Feder became a partner.

The productions comprise mainly all varieties of saddlery hardware, and range in quality from the plainer grades to the highly-finished gold-plated mountings. The factory occupies all of the four-story and basement brick building at the above location, and in addition another large building used for the forging department. The firm have produced many original styles of trimmings and some of their designs are secured by letters patent. Among the latter may be mentioned leather-covered harness trimmings, their peculiarity being that the seam of the leather is secured on the inside of the finnished article. The seam is covered with the metal lining, thus giving the appearance of solid leather, the result being an elegant style of trimming. These superb goods are known to the trade as the "Imitation Seam and Excelsior Leather-Covered Mountings." Careful attention is given to the manufacture of hames, which are made of wrought iron and forged by hand. They also excel in the manufacture of bits, and recently introduced a new pattern known as the "Sheridan bit," which has been received with great favor. Messrs. Wiener & Co. are never behind in perfecting new and better manufacturing processes and thus raising to a higher standard their particular branch of industry. The working force of the factory numbers 125 hands, and their weekly wages are \$1,000, The goods produced annually are valued at \$125,000 and are sold to jobbers in all parts of the United States and Canada.

CUTLERY MANUFACTORIES.

The art of making steel cutting instruments was known to the natives of India before the time of Alexander, and the famous Damascus blades, tempered in the city of the same name, have never been excelled. The achievements of those days, however, were, in the direction named, mainly confined

to perfecting implements of war. The invention and manufacture of the great variety of articles for domestic and industrial use are peculiar to modern times.

It would be interesting to note the gradual introduction of table cutlery, shears, scissors, pocket knives, etc., into general use. It is known, however, that for purposes of eating, cutlery has not been in use more than four centuries

Until quite recently the world's supply of cutlery came almost wholly from English manufactories. Owing, however, to the skill, improved methods, and machinery of American mechanics, this country is now renowned for producing the best qualities of cutlery, and in some lines of production it is supplying European markets. Two causes for these results may be specified. First, by the introduction of machines to do the work previously done by hand; second, owing to public taste and requirements a more highly finished article was needed to supply the demand, and here the originality and greater arsistic skill of our mechanics, constituted just those elements which have given to American cutlery its acknowledged superiority.

The cutlery made in Newark is almost entirely of the finer grades, and in one particular branch, the manufacture of shears and scissors, this city supplies the markets of the world. The superiority of Newark in making shears and scissors is almost wholly due to the mechanical genius of Mr. Rochus Heinisch, whose industrial triumph will be noticed further on.

BOOTH BROTHERS, Sussex Avenue and First-street. The manufacture of pen and pocket cutlery in Newark was begun in 1864 by the above firm, consisting of Messrs. Thomas and Charles Booth. They make all styles, from the highly finished knife to the cheapest goods in market. The superior quality of their more expensive knives is unsurpassed by the best American or imported goods. The Messrs. Booth are practical manufacturers, having had an experience of 38 years. Only English steel is used in the factory. The goods are sold to the trade in all parts of the country, and the "Booth" brand of pocket knives is favorably received wherever offered. Thirty hands are employed, and their weekly wages are \$360. The yearly manufacture of pocket cutlery is valued at \$35,000.

FURNESS, BANNISTER & CO., Nassau, Sheffield and Boyden streets. The productions of this manufactory consist exclusively of table cutlery, and that of the very finest quality, mainly finished in ivory and bone. The business was established in 1865, and has rapidly grown and prospered. The members of the firm are Messrs. W. Furness, A. F. Bannister and A. Ritchie. Their marked success in building up an extended trade is mainly due to their practical skill as mechanics, and giving personal attention to the processes of manufacture. The several partners learned the business of cutlery making in all its

details at the Lampson & Goodnow Manufacturing Company's Works, Shelbin Falls, Mass. They began, then, as workmen, and in due time each was a foreman. Every branch of their present business is supervised by one of the firm, and hence has the benefit of long experience and careful attention. While others have failed in the manufacture of fine cutlery, Messrs. Furness, Bannister & Co. have by their industry and strict attention to the wants of the trade met with signal success. The fact, that although the market has been greatly depressed, the business of this firm has increased during the past two years at an average rate of \$1,000 per month, speaks volumes for their prosperity and skill.

All the blades used by Messrs. Furness Bannister & Co., are made in Sheffield, England, where four hammers and eight grindstones are kept constantly in operation to supply the wants of the firm. In this way the best cutlery is produced, the superior blades resulting from the more painstaking manual labor of English manufactories being subjected to American ingenuity and artistic skill. Their productions are sold in all the large cities of the Union, and the demand is constantly increasing as the merits of the goods become known. It is evident that a better quality of goods are produced by those who make only the fine goods, than of articles in the same line from manufacturers who attempt the production of all styles down to the very cheapest. This firm is the only one in Newark making table cutlery, and partly on this account their productions will no doubt continue to rapidly increase. The working force of the factory numbers 25 hands, and the weekly pay roll is \$300. The cutlery manufactured in 1873 was valued at \$60,000.

R. HEINISCH'S SONS, 205 Bank-street; Salesroom, 301 Broadway, New York. In the manufacture of the best shears and scissors this country is preeminently in the advance, and this result has been reached in the workshops of Newark. The improved shears now in use are the result of inventions and improvements by Mr. Rochus Heinisch, who began in Newark during 1830 the manufacture of patent tailors' shears, and also a general line of shears and scissors.

Mr. Heinisch came to this country from Austria in the early part of the present century, and his first work was to manufacture surgical instruments in Brooklyn. He was a mechanic of great inventive genius and skill, and was of course continually making experiments. One result of these was the discovery of a process whereby steel could be welded on malleable iron. This was an important addition to the world's stock of practical knowledge, but the triumph brought to Mr. Heinisch no benefits, as he never applied for a patent.

Soon after he began the manufacture of shears and scissors, and his first improvement was a more convenient handle or thumb piece. This new design gave greater convenience in using, and with the Heinisch pattern for tailors' shears it was justly claimed that one man could accomplish as much as four, working with the old English round-bow thumb pieces. Since the original designs improvements have continually been added, and each of them is protected by letters patent. These perfected thumb pieces, although well known, may be described as a device whereby the hand in working is kept very nearly in its natural position, instead of being distorted and cramped, as by the old method. In this way the same amount of labor is far more effective. The shear blades are also constructed from original designs, and so made as to give a greater available cutting power. By his inventions Mr. Heinisch conferred never ending benefits on workers in cloth, and all those whose pursuits require the aid of shears and scissors.

For several years the business, as established by the senior Mr. Heinisch, has been conducted by his sons under the above style. In August of the present year the founder of the business, Mr. Rochus Heinisch, died, after a long life of great usefulness. His contributions to American industry will not soon be forgotten. The members of the present firm are Messrs. Rochus, Jr., Henry C., Albert A., and Edmund E. Heinisch. They no doubt inherit much of their father's ingenuity and skill, and are constantly perfecting improved designs. Under their direction the business will doubtless continue to increase and prosper.

The goods are sold in all parts of the country, and it is also a well known fact that the firm supplies the world with tailors' shears. They are shipped to Australia, and English tailors are compelled to work with the products of American workshops. These shears have received the highest premiums at the great fairs of London, Paris and Vienna, and were exhibited during the present autumn at St. Petersburg. In addition the firm manufactures the best brand of American razors.

The workmen employed in the factory number 80 hands, and they receive weekly wages to the amount of \$1,000. The production for 1873 was valued at \$125,000, and is increasing each year.

WÜSTHOFF & CO., 10 and 12 Library Conrt. The productions of this firm are shears and scissors. The business was established in October, 1872, by Charles Bontgen and Julius Storsberg. In September of the present year Mr. Fr. Wüsthoff became interested, when the above style was adopted.

The force of the factory numbers 15 hands, and the weekly pay roll is \$150. At the present rate of production the value of goods manufactured yearly is \$10,000.

The shears and scissors made are of the best quality, and from original and improved designs. Although recently started, the goods are sold in a large part of the country.

SPRING AND AXLE MANUFACTORIES.

The basis for the lightness and easy running qualities, which are the distinguishing characteristics of American carriages, was in the improved manufacture of springs and axles; other improvements have been the outgrowth of these. The superiority of American carriages would be best illustrated by a glance at the like product of European workshops, which are comparatively clumsy and unwieldy.

The manufacture of springs and axles is now mainly a distinctive branch of industry. Carriage, wagon, and railway car makers purchase the necessary springs and axles ready for use. The making of springs and axles is now a prominent American industry, and in this, as in most other lines of production, Newark has a prominent place.

JOHN H. REOCK (Passaic Spring Works), 272 to 280 Passaic-street. The productions of this factory consist exclusively of carriage and railway springs. The business was established in 1861 by the well known firm of Wm. Wright & Co., and the present proprietor, Mr. Reock, is their successor.

At these works are produced more heavy $2\frac{1}{2}$ and 3 inch springs than at any other factory in the country. The productions of the Passaic Spring Works have an established reputation, and are sold to jobbers from Maine to California.

The material used in manufacturing consists entirely of English steel, as from this a better article is produced. Seventy-five workmen are employed, and the wages paid weekly amount to \$800. The value of annual products are valued at \$200,000.

TOMLINSON SPRING COMPANY, 233 to 239 N. J. Railroad Avenue. Prominent in the manufacture of American springs and axles is the Company named above. It was organized in 1865, and the present officers are as follows: President, J. A. Gifford; Vice-President, W. G. Lineburgh; Secretary, Theo. Gray; Treasurer, E. M. Hotchkiss.

The reputation of the Company for the best springs and axles has been constantly extending since the commencement of business in 1865. Only the best brands of Swedish, English and American iron and steel are used. The productions comprise all styles of carriage springs and axles; also car springs made from the most approved patterns. Axles are made to a standard guage, and thus duplicates can be immediately furnished. The spring shop has a capacity of three tons of springs per day, and axles are made in like proportion.

Sales are made throughout the country, but largely to New York jobbers,

all of whom are supplied with "Tomlinson" springs and axles. The works being among the largest of the kind in the country, are an important part of Newark's industries. The buildings are extensive, covering an area of 222x100 feet. The annual products reach the large figure of \$250,000. Seventy-five men form the present working force, and the summary of weekly wages is \$1,100. Goods are sold both to consumers and jobbers.

D. & G. DELANEY, 83 and 85 Mechanic-street. The firm of D. & P. Delaney began in Newark the manufacture of coach, buggy and cart springs during 1860, and since then the firm name has been changed to the above style. The productions are confined to the varieties of springs named, including, however, all descriptions in that line. Goods are principally sold in near-by markets, though the "Delaney" springs are favorably known in all parts of the country. Only English and Swedish steel are used, thus doing much to insure the better grades of springs.

The working force consists of 15 hands, and the weekly summary of wages is \$275. The annual product is valued at \$40,000.

WIRE MANUFACTORY.

HENRY ROBERTS (New Jersey Wire Mills), 39 Oliver-street, near N. J. Railroad Aveuue. The earliest method of manufacturing wire was "to beat the gold into thin plates, and cut it into wires." The next step was to make wire from ductile metals by hammering, and this method was continued for centuries. The first wire-drawing was by hand, and flourished in the fourteenth century. Soon after, however, machinery was employed in the process, when the industry rapidly grew in importance. Germany at first took precedence in wire making.

There is scarcely a branch of metal manufacture of more universal application. With wire is made the powerful cables which suspend bridges, and cables for sub-marine telegraphs. It is woven into wire fences, and is made sufficiently delicate for the manufacture of fine wire cloth. The hair-like wire for astronomical instruments illustrates its use in the sciences.

The quality of being drawn into the finest wire depends on the ductility of the metal. From platinum, on account of its ductility, the finest wire is made. Other metals take precedence in ductility—or the quality of being drawn into fine wire in the order named: gold, silver, copper, steel, iron, brass and zinc.

The process of wire-drawing is quite simple. The iron rods, varying from one-fourth to one-half inch in thickness, are first annealed and then drawn by powerful machinery through dies, consisting of holes in steel plates. These dies gradually decrease in size in proportion to the required fineness of wire.

There are several extensive wire manufactories in the United States, and among them is the New Jersey Wire Mill in Newark, of which Mr. Henry Roberts is proprietor. The business was first established in 1858 by the firm of Laffey, Hughes & Roberts, but was afterwards changed to Hughes & Roberts, and in 1864 Mr. Roberts became sole proprietor.

The productions of this mill consist entirely of iron and steel wire, made from the best material, and in all sizes, from 000 to 40. Finer wires, however, are readily made to order. Mr. Roberts supplies iron wire for nearly all the purposes to which it is applied. Among the special kinds made are copper-covered wire for pail bails, wire for carpet-bag frames, rivets, mosquito netting, bolting cloths; also, an extra quality of tinned wire for making lanterns. Considerable business is done in making wire ferrules for paint brushes; for this purpose the wire, after being wound in the requisite shape is fastened together with solder, thus making a ferrule as if from a continuous piece of metal, and which is far stronger than any other used. Fine covered wire for the manufacture of bonnets is extensively made, the covering consisting of cotton yarn which is wound around the wire by ingenious machinery.

Mr. Roberts mainly uses Bessemer steel in the manufacture of steel wire. Among the uses of steel wire as made at this mill are for bed springs, stretchers and ribs for umbrella frames, and for sewing machine needles, fish-hooks, etc. One manufacturer alone requires, in the busy season, one ton per day for making fish-hooks.

In covering wire with other metals, and in finshing processes, Mr. Roberts excels. The annealing furnaces of the mill have a capacity of 12 tons of iron and 1½ tons of steel per day. The mill has facilities for making 150 tons of wire per month or 1,800 tons per year. The market for these goods extends over the whole country, and to show the standard quality of the wire, it is only necessary to state that Mr. Roberts employs no traveling salesmen, orders being received direct at the factory. The working force numbers 50 hands, and the weekly pay roll is \$900. The aggregate value of yearly productions reaches \$200,000. Mr. Roberts has the only iron and steel wire manufactory in Newark, and his production will doubtless increase as the wants of the country require,

SAW MANUFACTORY.

The saw has ever played a conspicuous part in the economy of manufactures, and on this account its production employs a vast amount of labor and capital. It is interesting to note that the first saw mill erected in England, to be worked by other than hand power, was built in 1596, and, strange as it may appear, so great was the indignation at its erection on the part of saw-yers, that Parliament was forced to pass a law prohibiting the erection of saw mills driven by wind or water power. This spirit of opposition continued for more than 60 years before these needed improvements were tolerated. It seems that the first application of steam to the driving of saw frames was in 1793.

The introduction of the saw into America was coïncident with its settlement, and their manufacture from small beginnings has gradually grown until now the best saws in the world are made in the United States. In this direction American industry has achieved a signal triumph, and while the foreign producer is fairly beaten at every point, an important and growing foreign trade has sprung up in American saws.

RICHARDSON BROTHERS, (Passaic Saw Works,) Railroad Place and Commercial-street. Newark has but one saw manufactory, but this one alone has been sufficient to place the city in the front rank as regards the production of the best American saws. The result named has been due to the exertions of the firm named above. Mr. C. Richardson began the manufacture of saws in Newark during the year 1859. His brother was associated with him in the business, whence arose the firm name. The brother has since died, and Mr. C. Richardson is now sole proprietor. From its inception, however, he has been the master-spirit of the enterprise, and to his practical skill and originality this branch of American industry is greatly indebted.

The firm manufactures all styles and varieties of saws. Original designs have been introduced, some of which are patented. Mr. Richardson's main secret of success has been his improved methods of tempering steel, all of which are of his own invention. One, in particular, was perfected in 1867, and at the time created quite a commotion among saw manufacturers. In the works are used improved styles of machinery of Mr. Richardson's own designs and patents.

In addition to the manufacture of saws, Mr. Richardson makes an extra quality of hay and straw knives, mowing and reaping knives, cane, mineing

knives, and circular and straight machine knives for cutting rubber; also, moulding and plowing irons, slate and mitre cutters, and plastering rods.

These goods find a market in all parts of the country, and the firm supplies nearly all the leading New York hardware houses. Shipments of butcher saws are occasionally made to the Liverpool markets. The working force of the factory numbers 50 men, and the wages paid weekly amount to \$800. At the present rate of production the goods manufactured annually amount in value to \$70,000.

SCALE MANUFACTORY.

F. MEYER, 61 and 63 N. J. Railroad Avenue. If we were to mention the various industries in which Newark manufacturers excel, the list would include quite all the lines of production represented in this busy city. As in other manufactures so in the production of scales. The high reputation which Newark scales enjoy in the markets of the world, is almost wholly due to the inventive skill and energy of Mr. F. Meyer's, who has been established in scale manufacturing in Newark since 1867. Previously, however, he had carried on the same business in Philadelphia since 1840. The advantages of Newark as a manufacturing centre induced the change of location.

Mr. Meyer's goods are known as U. S. Standard Scales, and he also manufactures the celebrated Brown scales, with added improvements. When he began business in Philadelphia the manufacture of scales in the United States was inconsiderable, and to show his rapid advancement in the business it may be mentioned that in 1845 the Government employed him to manufacture scales for the U. S. Mints. The Meyer scales have universally received the first premiums and commendations whenever exhibited at fairs and expositions. This has been true of New York, Philadelphia, Pittsburg, Chicago and St. Louis exhibitions. Much of Mr. Meyer's great success may be attributed to his unquestionable, inventive genius, as shown in several valuable devices hitherto unknown in this line. Among them may be mentioned his patent seamless scoop, made of one piece of metal, giving greater strength, elegance and cleanliness. Another of his patented inventions is a machine for finishing scale pivots, which adds to the accuracy of balances and also saves much tedious labor.

The scales produced are of all sizes and for nearly all uses; from the finest assay scale up to the heavy railroad track scale. A fact which throws much light on the practices and customs of many manufacturers is this: More than one

American scale manufacturer, the fame of whose productions is heralded far and wide, have their finer qualities of scales made by Mr. Meyer. A side light is thus thrown on the reputed manufacturing skill of certain firms.

The warerooms of the manufactory are at 27 Park Row, New York. The demand for these superior scales is constantly increasing, and orders are occasionally received from South America and Cuba. The hands employed in the factory number 16, and their weekly pay roll is \$200. The value of annual production is \$30,000.

COACH AND CARRIAGE HARDWARE MANU-FACTORIES.

ORLANDO & S. B. GREACEN, 74 Lawrence-street. The productions of this firm comprise coach and carriage hardware. The house was established in 1865 by Mr. Orlando Greacen, and the present style dates from 1870, when his brother, Mr. S. Bailey Greacen, became interested in the business.

The rapid growth of this manufactory into its present prominence, still further illustrates the sterling character of the men who have contributed most to the industrial preëminence of Newark. The Messrs. Greacen manufacture coach and carriage hardware of the finer grades exclusively, producing nothing in the rough. All the articles, from rails for hearses to pole tips, are finished in nickle, oroide, silver and gold. The senior partner, Mr. Orlando Greacen, is the business manager of the firm, while the brother has the supervision of the manufacturing department. An important element in their success has been a strict attention to business and a keen appreciation of the wants of the trade. From the establishment of the manufactory by the senior partner the business has had a steady and rapid growth, and is now ten fold greater than at the close of the first year. The machinery, dies and tools used, are all made in the factory, the practical skill of the Messrs. Greacen being able to overcome all difficulties in the way of producing new and improved designs. All goods are made under a trade mark and warranted. Sales are made to jobbers in the United States, Canada, Mexico and South America.

Within a few years, owing to the increased business, better producing facilities were required, and the result was the commodious and well arranged factory at present owned and entirely occupied by the firm, which was built from original designs and is considered a model of its class. The force of the factory numbers 50 hands, and the weekly wages are \$500. With this force the goods produced annually are valued at \$100,000.

C. N. LOCKWOOD & CO., 18 to -22 Mechanic-street. Only through an almost complete division of labor have the great improvements peculiar to the present condition of manufactures been possible. This is well illustrated in the construction of American carriages, which are celebrated the world over for lightness and elegant finish. An important element in bringing about this result has been the efforts of American manufacturers of coach and carriage hardware.

Perhaps the oldest firm in the country in this line is the one named above. The business was established in 1845 by Mr. C. N. Lockwood. At that time this branch of manufacture was of slight importance, and it was developed to its present prominence only through great originality and enterprise. New designs in carriage trimming have resulted quite as much through the efforts of the hardware manufacturer as from the carriage makers themselves.

Mr. C. N. Lockwood, founder of the above firm, was a pioneer in the manufacture of coach and carriage hardware, and the house he was instrumental in establishing is now, perhaps, the largest of its class of trade in the country. In 1861 the present firm was organized by the admission of Messrs. C. I. Langstroth and W. H. Ingraham as partners. Since then the business has met with increased and continued prosperity.

The goods manufactured by the firm consist of fine plated carriage mountings in nickel, silver and gold. A well known specialty is the manufacture of a great variety of coach and carriage lamps, from original designs, for which the firm are justly celebrated, and in this branch of industry they are the largest manufacturers in the United States. The productions of this house have an acknowledged reputation for standard excellence and originality of designs. A further evidence of the great enterprise of the firm is manifested by their illustrated catalogue issued to the trade, which for typographical appearance is seldom equaled.

The unrivaled goods of C. N. Lockwood & Co. are sold throughout the United States, and are largely exported to Cuba, Mexico, South America and Europe. Forty hands are at present employed in the factory, their weekly wages being \$500. The value of annual products are \$150,000.

G. OTTO, 44 Mechanic street. This house was established 20 years ago, and its principal manufacture is a superior quality of coach hinges, looks, dove tails, spring barrels, &c. Mr. Otto is now sole proprietor, having succeeded H. Zeigler. The goods are sold to dealers throughout the country, and the annual product is valued at \$8,000. Five hands are employed, their weekly wages amounting to \$70.

RICHARDSON & HALL, 32 Mechanic-street. This manufactory produces as a specialty coach lamps and fire engine signals. The business has been conducted by the present proprietors, Messrs. David H. Richardson and Francis

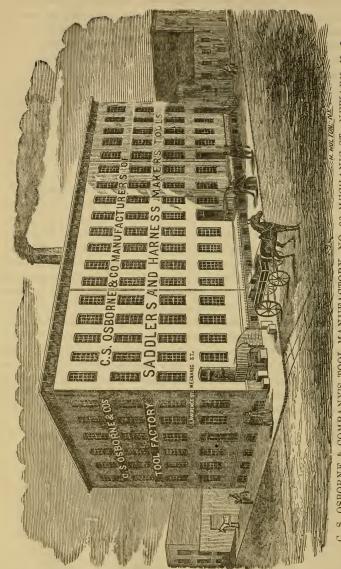
Hall, since 1868. Lamps of all grades are made, comprising an almost endless variety for use on an ordinary vehicle or the finest coach. The goods are sold to jobbers throughout the country, and the factory gives employment to 21 hands. The weekly wages are \$250, and the value of yearly production is \$30,000.

A. STIVERS, 25 Mechanic-street. Mr. Stivers began the manufacture of coach locks and a special line of coach trimmings in the year 1838. He employs five hands, paying weekly wages to the amount of \$70. The value of annual production reaches \$9,000. Goods are principally sold to manufacturers in home and eastern markets.

HARDWARE & TOOL MANUFACTORIES.

JOHN CHARLTON, 20 and 22 Arch-street. The productions of this manufactory consists of mechanics' tools, and a general line of hardware. The specialty, however, is the manufacture of mechanics' tools, particular attention being given to hatters' tools and irons. Mr. Charlton began the business in 1843, and at that time had but two workmen. Since then, however, he has employed at one time as high as 75 hands. A principal element of success has been his ability to supply the wants of particular localities. He has continually eatered to the demands of the trade. The habits and customs of workmen in different countries, and even in different parts of the same country are very dissimilar, and these caprices and necessities Mr. Charlton, by energy and ingenuity, succeeds in satisfying. Sales are made in all parts of the United States including California and Utah. He supplies the Mormons at Salt Lake City very largely with tools and hardware. Shipments are made to the West Indies, and also to Germany. The present working force is small owing to the depressed market, it numbers, however, 25 hands, and the weekly pay roll amounts to \$300 The value of annual product is \$75,000.

C. A. DE HART, (Newark Edge Tool Manufactory,) 78 Adams-street. This factory was established in 1856 as an iron foundry, but the business underwent a change and now the manufacture of edge tools is a specialty, and the only founding done is in making small grey iron castings. The business has been conducted by successive firms, but now Mr. C. A. De Hart is sole proprietor. His brands of hatchets, axes, picks, &c., are favorably received everywhere, and have a standard reputation. Goods are sold principally to New York jobbers, though the market extends to the West Indies, South America and California. Thirty hands are employed and the weekly pay roll is \$450. The yearly productions amount to \$60,000.



C. S. OSBORNE & COMPANY'S TOOL MANUFACTORY, NO. 96 MECHANIC ST., NEWARK, N. J.

C. S. OSBORNE & CO., Mechanic and Lawrence streets. The history of American manufactures has never been fully written. In fact, the data for such a work are not available; the noble efforts which have contributed to the stupendous results now attained are not generally a matter of record. It is interesting, however, to note those firms whose history has been continuous with the development of the country's industries.

Occupying a first place in this respect is the firm of C. S. Osborne & Co., at the location named above, and manufacturers of saddlers' and harness makers' tools, and a general line of house furnishing hardware.

The firm was founded in 1826, by Joseph English, and is thus the oldest house in Newark in its line, and was doubtless the pioneer house in the United States. At the time the business was established American manufacturers were in a feeble state, the wants of the country being supplied by European artizans. Extraordinary energy and enterprise were required to compete successfully with the foreign producer and establish a new industry on this side of the Atlantic. For these reasons the firm of C. S. Osborne & Co., are deemed worthy of far more than ordinary attention.

The business was continued by Mr. English in a moderate way until 1856, when Mr. C. S. Osborne, senior partner of the present firm, became associated as a principal proprietor of the manufactory with Wm. Dodd. The latter gentleman retired in 1862, and H. F. Osborne, a brother of the senior proprietor, was admitted as a partner. The business was thus continued until 1867, when the senior partner's son, Jasper C. Osborne, was associated in the business.

The main growth and extended business of the firm dates from 1856, when Mr. C. S. Osborne's great energy and business talents were enlisted in their favor. It is unnecessary here to dwell upon his efforts, as the head of this great firm, in the promotion of Newark's industries. He has already been heralded in the press of the country as one of the self-made men of the times. His history and that of his firm should be great incentives to those who would know the benefits to be derived from patience in well doing and untiring industry. Previous to his career as a manufacturer Mr. Osborne had been successfully engaged in mercantile pursuits. Though not trained in mechanical skill, he possessed the genius and taste so requisite for success in his new field of enterprise. His policy on beginning the manufacture of tools was to turn out work of the first quality, and this, together with inventive skill in devising new and improved articles to meet the demands of the trade, are the main causes of his success. He has carefully supervised the operations of his factory, which is now one of the most extensive of the kind in the country. Mr. Osborne has, with admirable judgment, kept aloof from politics and everything which could divert attention from his legitimate pursuits. By this course he has achieved a brighter record; for the pioneers and leaders in the nation's industries, are the architects of her prosperity.

The business of the firm is carried on in a large factory having four full stories and a basement. The working force numbers 50 hands, and here are pursued all the methods of manufacture, from forging and the turning of tool handles to the finest finishing processes. The utmost order and regularity pervade all departments, thus showing Mr. Osborne's executive ability.

On the first floor are the offices and salesroom, and here is an elegant case of goods which was given the first premium at one of the American Institute Fairs.

To enumerate all the articles made by this firm would fill a fair-sized volume. Their stock is complete in harness, trunk, trimmers' and saddlers' tools. The line of house-furnishing hardware is very full, and comprises a great variety of useful articles including sardine knives in various patterns, nut crackers, &c. An extra quality of nippers, punches, and gas pliers is also made.

The factory has a capacity for employing from 150 to 200 workmen. The productions of the firm are sold in all the States of the Union, and are also exported to foreign countries.

FOERSTER & KRAEUTER, Hedenberg Works. This firm began business in 1864 and manufacture a general line of hardware and mechanics' tools. A superior quality of pinking machines is made from their own inventions and patents. The firm consists of Messrs. H. Foerster and A. Kraeuter, and they are among the principal manufacturers in the famous Hedenberg Works, where are made so many different articles of ornament and utility. The productions are sold to the trade in the principal cities of the Union. Twenty-two hands are employed, and the wages paid weekly are \$350, the annual productions being valued at \$40,000.

WILLIAM JOHNSON, Hedenberg Works. This manufactory is one of the oldest in Newark, and was established in 1834 by William Johnson, father of the present proprietor, who succeeded to the business in 1866. The productions consist of a general variety of tools, a specialty being carpenters' tools. The plumbs and levels made by Mr. Johnson have a standard reputation, and are everywhere favorably received. A patent adjustment for plumbs and levels is also manufactured, which is a great improvement in these articles. Mr. Johnson has several valuable patents, and many of his tools are from original designs. He manufactures a general line of house-furnishing hardware, in this direction new and useful articles are constantly being produced. A larger variety of goods is made at this factory than by others in the same line.

In making edge tools Mr. Johnson has done much to establish the superiority of American steel, as he uses no other, and purchases that made in Newark by Benjamin Atha & Company, at the Newark Steel Works. Sales are made in all parts of the United States from Boston to San Francisco, and goods are shipped

to Australia and South America. The statistics of the manufactory are embraced in the summary of this branch of industry.

CHARLES KUPPER, 9 Mulberry-street. The productions of this factory consist exclusively of traveling bag frames. Mr. Kupper began the business in 1870, and has now a rapidly growing trade. Seventeen hands are employed and the weekly wages are \$150. The annual product is valued at \$15,000.

R. NEUMAN & CO., 13 Mulberry-street; salesroom, 76 Duane-street, New York. The manufacture of bag frames in Newark is an important industry and among the largest houses is the firm named above. The business of manufacturing was established by this firm in Newark during 1869. The working force of the factory numbers 65 hands, and the weekly pay roll is \$800. The bag frames, locks and trimmings produced yearly amount in value to \$140,000.

M. PRICE, 334 to 338 Mulberry-street. Mr. Price began the manufacture of edge tools in Newark during 1846, and the manufactory is therefore one of the oldest in this line. The business is mainly confined to the manufacture of hatchets in all varieties, and a fine quality of adzes, and in these respects is the largest in this city. The present working force of the factory numbers 30 hands, and the wages paid weekly amount to \$350. With this force the annual production of tools would amount to \$50,000. These figures, however, are not a proper criterion for judging the manufactory, as only recently its producing facilities have been doubled, and with the revival of trade the whole capacity will be employed. The goods are sold to hardware dealers in all parts of the country, and are exported to Cuba, Mexico and South America.

M. B. PROVOST, Hedenberg Works. This manufactory, of which Mr. Provost is now sole proprietor, dates its establishment 40 years ago. The production comprise nearly all kinds of heavy edge tools. A specialty is made of planing knives, and in these an extended trade is carried on, though the business generally is in the home market. Work is confined to the best grades of goods. Five hands are employed, to whom are paid \$125 weekly. The yearly products amount to \$12,000.

H. SAUERBIER & SONS, 34 to 38 Mechanic street. The productions of this firm comprise a general line of saddlers', trunk makers', carriage trimmers', tanners', shoemakers' and curriers' tools, including machinery for leather. No other house in the country manufactures so great a variety of tools, and it is the largest in their line. For the purposes named they supply a great part of the tools required in the country, and their productions are also sold in foreign countries.

The founder of the firm, Mr. Henry Sauerbier, came to this country in 1839,

his principal capital, at that time, being personal energy and integrity of purpose. He at once began working at the bench, and through habits of industry and economy, was enabled in 1848 to commence in a small way the manufacture of tools for himself. The business was a success and met with continuous prosperity. In 1870 the style was changed to H. Sauerbier & Son by the admission to the business of Henry Sauerbier, Jr. In 1873 Mr. Theodore Sauerbier was admitted as a partner and the present style adopted.

The business of the firm, regarded in all its details, is wonderful. A summary of the tools required by the trades named, would present an almost endless variety, and a multiplicity of shapes and forms. In order to supply the continual demands of the trade for new and improved tools, much inventive skill is required. This has been fully supplied by the elder Mr. Sauerbier. Now after many years of great usefulness the management of so extensive a business devolves more upon the sons, and happily for the growth of the several industries represented by the firm, they are quite capable of carrying on the work so well begun. Mr. Henry Sauerbier, Jr., has the financial direction of the business, and through his executive ability it will no doubt increase as the demands of the trade require. Mr. Theodore Sauerbier has the immediate supervision of the manufacturing department.

The elder Mr. Sauerbier is prominent in all movements for promoting the prosperity of Newark. He has a just degree of municipal pride in the city which supplies so large a part of those articles of utility and ornament which the wants of the age require. He was among the first to appreciate the great benefits to be derived from an exhibition of the city's productions, and the Newark Industrial Institute was in great part the result of his efforts.

The firm's goods are sold in all parts of the country, from the Atlantic to the Pacific, and are exported to Cuba, South America, Germany and Norway. The present working force of the factory is 75 hands, and the weekly pay roll is \$800. With the workmen now employed the annual production of tools is valued at \$125,000. With the revival of trade, however, this will be largely increased.

SPAETH & GUELICHER, Hedenberg Works. The productions of this firm consist entirely of fine steel skates, and it is the only house in Newark making skates exclusively. The goods made are the celebrated Club Skates. of Day's patents, and known as the "American" and "Clipper" styles. With these skates all straps and buckles are dispensed with, the skate being fastened to the foot by an ingenious mechanism which is operated instantly, and by a single movement.

The firm was established in 1866, and its members are Messrs. E. Spaeth and Charles Guelicher. The productions are sold to jobbers and the demand for the Club skate is increasing every year, and they are largely sold in Europe.

Twelve hands are employed in the factory, and the weekly pay roll is \$200, the value of annual products being \$25,000.

HENRY SOMMERS, 40 and 42 Warren-street. This manufactory is engaged in the production of saddlers' and mechanics' tools, in addition to which a specialty is made of the celebrated "K. F. M.," or improved Knox Fluting Machine. These machines, during the time they have been in the market, have, by their superior merits, commended themselves to buyers as among the best made. They possess all the advantages claimed by other machines, in addition to which is added the improved spring for regulating the pressure of the cylinders. They are exceedingly simple in operation and not liable to get out of order. The improved "Knox" was patented by Mr. Sommers in 1871, and up to the present time an extensive trade has been established.

Five hands are employed, with a weekly pay roll of \$75, and the productions for 1873 were valued at \$22,000.

WILLIAM WHITE, Railroad Place and Commercial-street. The products of this factory are edge tools, and comprise axes, adzes, hatchets, brush hooks, etc. The business was established in 1852 and the goods produced are mainly sold to jobbers in New York, Philadelphia and other Eastern cities. Fifteen workmen are employed, the weekly pay roll being \$200. The annual production is valued at \$25,000

WICHELHAUS & ROTHE, Hedenberg Works. This firm was established in 1862 and consists of Messrs. Frederick Wichelhaus and Charles Rothe. The productions are house-furnishing hardware and mechanics' tools. Sales are made generally throughout the United States. Only first-class mechanics are employed in the factory, and the products are of like character. The working force numbers 15 men, the weekly wages being \$200. The annual production amounts to \$25,000.

LANGSTROTH & CRANE, 14 Mechanic-street. The products of this factory comprise a general line of builders' hardware, a specialty being a fine grade of locks. The business was established in 1850 by the present firm. Fifteen hands are employed, the weekly wages being \$200. The value of annual production amounts to \$20,000.

JOHN TOLER, SONS & CO., 108 to 114 Adams-street. This manufactory occupies an important position in the industries of Newark, being the only one in the United States confining itself exclusively to the manufacture of casters. The business was established in 1844 by Mr. John Toler, the present senior partner, in a modest way, but owing to the increasing demand of the trade and the superior quality of his productions, Mr. Toler soon found himself in the foremost rank of American manufacturers, and to-day the house he has established is among the standard firms of Newark. In 1867 Mr. Toler asso-

ciated with him in the business his two sons, Francis J. and Charles H. Toler, and Mr. Joseph III (the latter gentleman having been the foreman of the factory for sixteen years) when the present firm style was adopted. Each partner has his special line of duty—all being practical in their several departments. The machinery and models used in the factory are all from original designs by the senior partner, and manufactured by the firm. Their great success is due to the fact that they have spared no effort to obtain the best possible workmen, and have used only the finest quality of material.

Over 400 different patterns of casters are manufactured, all of which are warranted to be made from the best stock obtainable, and the pivots and wheel pins from carefully selected wire. The unrivaled products of the firm are sold throughout the United States and principally in New York, Philadelphia and other large cities. The present working force numbers 60 hands, with a weekly pay roll of \$800, the annual production being valued at \$100,000.

CORNELIUS WALSH & SON, N. J. Railroad Avenue and Hamilton-street. Already in this volume it has been shown how large a part of Newark's industries is made up of trunks and traveling bags. A branch of industry quite as important, is the manufacture of bag frames and a general line of trunk hardware. Until the last few years the finer qualities of bag frames were imported from France, but American skill has been victorious and now the demand is almost wholly supplied by home manufacturers.

The firm named above was a pioneer in the manufacture of American traveling bag frames, and is now the most extensive manufactory in this branch of industry in the United States. The business was established over a quarter of century ago by the senior partner, Mr. Cornelius Walsh, who by honesty (not as a policy, but a principle), combined with sagacity, vigilance, and unflagging energy, bears testimony to the maxim, "Every man is the architect of his own fortune." Mr. Walsh now has the pride and satisfaction of seeing the manufactory thus established by him 30 years ago, the largest of its class in the country.

The first productions of the house were trunk rivets, but the business rapidly grew and now comprises traveling bag frames, japanned and covered frames for ladies' satchels, &c.

In 1865 Mr. J. Clinton Walsh, the son of the founder, was admitted as a partner and the present firm style adopted. The factory is of immense proportions, having a frontage of 320 feet and is 130 deep, being four stories high with a basement. The upper floor presents perhaps the busiest scene and a greater variety of labor than any part of the factory. Here are made the rivets and those large brass-headed nails which present such an appearance of solidity upon common trunks.

The materials used in making frames are English and American sheet and hoop iron, sheet brass and brass wire. All the tools used by the firm are made and repaired by them in their own machine shop upon the premises.

The goods of this house have an established reputation, and are extensively sold to the trade in all parts of the Union. The hands employed number 125, and the weekly pay roll is \$850. The annual production is valued at \$175,000.

MANUFACTURES IN IRON—SUMMARY.

| Manu | factures in iron of every kind | 100 |
|-------|--------------------------------|----------------|
| Total | number employees | 3,759 |
| 44 | amount of wages paid weekly | \$45,210.00 |
| ** | " wages paid per year | \$2,350,920.00 |
| ** | value of annual productions | \$7,062,000.00 |

Comprising:

| | | | | No. of em- ployees | Weekly Wages. | Annual Production. |
|----------------------------------|------|--|----|--------------------------|------------------|-----------------------|
| Steel Manufactories | | | 1 | 90 | \$1,200 | \$500,000 |
| Iron and Machinery Manufactories | | | | 1,353 | 17,685 | 2,503,000 |
| Steam Boiler | ** | | 2 | 65 | 750 | 175,000 |
| Steam Fire Engine | " | | 2 | 50 | 950 | 80,000 |
| Smoothing Iron | . 6 | | 1 | 60 | 700 | 100,000 |
| File | " | | 4 | 91 | 815 | 98,000 |
| Iron Safe | 44 | | 1 | 3 | 50 | 20,000 |
| Iron Railing | LL | | 3 | 52 | 750 | 105,000 |
| Saddlery Hardware | 44 | | 16 | 847 | 8,335 | 1,115,000 |
| Coach & Carriage Hardware | e '' | | 5 | 121 | 1,390 | 297,000 |
| Hardware and Tool | 44 | | 17 | 596 | 6,700 | 1,049,000 |
| Saw | " | | 1 | 50 | 800 | 70,000 |
| Spring and Axle | 66 | | 3 | 165 | 2,175 | 490,000 |
| Wire | 44 | | 1 | 50 | 900 | 200,000 |
| Scale | 66 | | 1 | 16 | 200 | 30,000 |
| Cutlery | | | 4 | 150 | 1,810 | 230,000 . |

MANUFACTURES IN METALS

OTHER THAN IRON.

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BRASS AND COPPER WIRE AND WIRE CLOTH MANUFACTORY.

STANIAR & LAFFEY, Passaic Avenue; salesroom, 53 Fulton-street, New York. The products of this manufactory are brass and copper wire and wire cloth.

The manufacture of fine brass and copper wire in this country is of quite recent growth, having reached its present proportions during this generation. Previously, the finer grades of brass wire were imported from Europe, and principally from Germany, where its manufacture is still very extensive.

The growth of brass wire-making in this country is mainly due to the exertions of Mr. William Staniar, a native of Manchester, England, and who came to this country in 1847. He soon after began the manufacture of brass wire at Belleville, which is now a suburb of Newark. At the same time he commenced the production of the "Fourdrinier" wire cloth, which is now regarded as an absolute necessity in the manufacture of paper.

It is only necessary to mention here that the cloth spoken of is used on the "Fourdrinier" machine as a means of completing the first process of paper making. On an endless band of this fine wire cloth the prepared pulp is first evenly spread in proportion to the required thickness of paper. Conveyed on the cloth, the water passes through the interstices, leaving the pulp comparatively dry, with the particles adhering, and thus the first stage in paper making is completed. As no paper is made without this cloth, the great importance of brass wire and wire cloth manufacture is obvious.

The "Fourdrinier" machine was first invented by Louis Robert, a workman in the factory of Pierre F. Didot, in France. The invention was sold in England to the Messrs. Fourdrinier, a firm engaged in the stationery business. These gentlemen expended about \$300,000 in improving the process, and as a result became bankrupt. Their labors, however, were no less successful. From them the machine took its name, and this was their sole reward. These facts have been related to give added interest to the branch of industry mentioned in this article.

By the introduction of the paper-making machine named, a new industry was quickened into life and activity, namely, the production of the necessary wire cloth of the requisite quality and texture. To the manufacture of fine brass wire and the "Fourdrinier" cloth, Mr. Staniar applied himself with the skill and enterprise which were sure to result in success, even under adverse circumstances. He found the production of fine wire in the United States in a very primitive condition, and the first requisite was to supply the deficiencies, that successful competition with the imported article might be maintained. After years of perseverance this was accomplished; brass wire of the requisite quality and finish was produced, and successfully woven into "Fourdrinier" cloth of superior texture and finish. Much difficulty was at first experienced in overcoming the prejudice which unjustly exists against "home production." This, however, has now been entirely surmounted, and the "Fourdrinier" cloth as perfected by Mr. Staniar is regarded as preferable to the best imported, while to him is given the credit of originating an important American industry. It is also an honor to Newark that such an industrial triumph should be developed here, and more so as this is the only manufactory of the kind in the country, there being only two others in the world.

Mr. Staniar was sometimes associated with others in business and again alone until 1866, when the firm named above was organized, his associate being Mr. John Laffey, who brought to the business additional and valuable experience in wire making. At that time the present factory was built by the firm, and since then the business has met with increased prosperity.

The processes of manufacture are very interesting, but want of space forbids a detailed description. The wire, however, is all made from the raw material, the copper and spelter for the brass being received at the factory in the ingot and there combined in the proper proportions, and after several processes the metal is transformed into square strips similar to nail rods. These strips are then subjected to the drawing process and the result is the finished wire. Ordinary metals will not answer for making the dies through which the finer sizes of wire, necessary for making the "Fourdrinier" cloth are drawn. For this purpose a particular metal, known as "German plate," is imported, and it was first brought to this country, with workmen to manipulate it, through Mr. Staniar's efforts. The wire cloth is woven by hand in various widths, on looms which, though simple in construction, are very heavy, weighing over three tons each, and standing in solid masonry.

Another great success in paper mill machinery as manufactured by this firm, is the device known as the "Dandy roll," for producing the beautiful water line monograms which appear in Government envelopes, postal cards, and other paper. This also was the result of Mr. Staniar's ingenious skill. About 20 years ago the U. S. Government, wishing to issue water-marked envelopes, thought it necessary to send to England for the "Dandy roll." Mr. Staniar

hearing of this, interposed his objection, and the work being giving him, he produced the water marked envelope to the satisfaction of the Government. The "Dandy roll" is simply a revolving cylinder of wire cloth, having upon its surface ingeniously woven designs, which being imprinted on the passing paper, when in a yielding state, the result is the desired water line. The "Dandy roll" made by Messrs. Staniar & Laffey is regarded as superior to any of foreign manufacture. They are used by the Canadian post office and treasury departments, and the governments of Japan and Spain, and its use is gradually extending everywhere. The water-lines which form the monograms in the paper used by the Tribune, Herald, and other metropolitan journals, are made on this firm's machinery.

Their trade extends over the whole country wherever paper mills are in operation. Even in conservative China their machinery is used, where but recently paper was made upon reeds woven into a sort of cloth. In addition to their work for paper mills, they make a general variety of brass and copper wire and wire cloth, the latter being used for window shades, strainers, &c.. a specialty being fine cloth for rosin and sugar strainers. They also manufacture wire rope of all kinds, by improved processes and machinery patented by the firm. The working force of the factory numbers 33 men, and the weekly pay roll is \$456. The annual production is valued at \$125,000.

PLUMBERS' BRASS WORK MANUFACTORIES.

WM. M. EDWARDS, N. J. Railroad Avenue. While Newark has not achieved such prominence in the manufacture of plumbers' brass work as in some other lines of production, there are a few firms engaged in making a superior quality of goods in this line. Prominent among them is the manufactory of Mr. Wm. M. Edwards, who makes brass work for water. steam and gas. Fifteen hands are employed in the factory, and the wages paid weekly amount to \$165. The yearly production of goods is valued at \$40,000. The markets are mainly in New York and near-by cities.

HEDGES & BROTHER, 7 Railroad Avenue. This firm manufactures plumbers' brass work, and was established under the present style in 1864.

Recently the facilities of production have been enlarged, and with the revival of trade the business will be further extended. In addition to the many new improvements produced by this firm, a specialty may be named as Hedges, Patent Self-Closing Faucet, for which letters patent were granted the inventor in 1871. In this faucet the valve is opened by pressing the lever in any direction, and closes of itself when the pressure is removed. The goods are mainly sold in New York and near-by markets, though shipments are occasionally made to the West. Nine hands are employed, and the weekly wages are \$100, the yearly production being valued at \$16,500.

J. T. VAN ARSDALE, 271 Market-street. This is the oldest manufactory in Newark producing a general line of plumbers' brass work, having been established in 1849. Mr. Van Arsdale is a practical workman, having commenced work at the bench in New York when a boy. In this factory are usually employed 11 hands, and the weekly wages are \$130. The annual production of brass work is valued at \$20,000, and sales are principally made in the home and near-by markets.

CARRIAGE AND HARNESS ORNAMENT MANUFACTORIES.

ROBOTHAM & GREACEN, 12 Mechanic-street. This firm manufactures harness ornaments of all descriptions, and was established in 1854, and its present members being Messrs. Wm. Robotham and Walter Greacen. They are perhaps the largest producers of shelf goods in this line in the country. The great variety of ornaments used to decorate and finish the styles of harness now demanded require a large capital and considerable knowledge and skill in their manufacture. Messrs. Robotham & Greacen's stock comprises complete styles in rosettes, gag runners, pad screws, saddle nails, name plates, bit and front ornaments; also plain and fancy letters and figures, finished in nickel, oreide, silver, and gold. A specialty of the firm is what is known as silver shell goods, whose wearing qualities are hardly inferior to solid metal.

Newark is the principal depot for harness ornaments in the country, in fact nearly all the fine goods made are produced here. The firm of Robotham &

Greacen is well known throughout the country, and the standard quality of their goods is everywhere acknowledged, while new and improved designs are constantly being originated by them. They export occasionally to Brazil. The hands employed in the factory number 25, and the amount of wages paid weekly is \$350, the value of annual production being \$60,000.

JOHN B. KAAS & CO., 224 Market-street. This firm manufactures coach, carriage and harness ornaments of every description, and was established in 1866 under the style of Meyer, Kaas & Scriba. In 1868 the present firm was organized, and its members are Messrs. John B. & Adam Kaas. The average working force is eight hands, the weekly wages being \$90. The annual products are valued at \$18,000.

ROBOTHAM, WALDRON & CO., $15\frac{1}{2}$ Mechanic-street. This factory was established in March of the present year, and the productions are coach and carriage ornaments. Three hands are employed and they are paid weekly \$40. The annual production cannot as yet be estimated.

REYNOLD & ZAHN, 46 and 48 Mechanic-street. This firm manufactures saddlery ornaments, but declined to furnish any information regarding the nature and extent of their business.

MANUFACTURERS OF BRASS AND METAL SMALL WARES.

STEVENS, ROBERTS & HAVELL, 284 to 286 Washington-street. Those unfamiliar with the details of the business have no adequate idea of the extert and variety of goods known as fancy steel and brass goods. An attempt at enumeration would only end in failure. The ingenuity and skill required to supply the demands of society in this regard, are entitled to much of the praise so freely, yet justly, bestowed on American mechanics. It is not many years since a large part of these goods were imported, and especially from France. Now, however, American originality and skill fairly supply the home market, from steel buttons and shoe buckles to bag frames and trimmings.

In the production of these goods Newark has long been prominent, and now, owing to the energy and enterprise of her manufacturers, this city fairly surpasses other towns in the fancy steel and brass goods made, both as regards the

quality and quantity of productions. The people of Newark have cause for congratulation that their city has in this still further established her industrial preëminence. Dealers throughout the country should know that now and henceforth this city is the chief source of supply for these articles. It is fitting that the city which is already regarded as the principal emporium for so many lines of production should achieve still greater distinction.

The firm named above well illustrates the houses which have been foremost in bringing about these results. The business was established in 1845 by James Bishop, and was conducted by him until 1863, when he was succeeded by the firm of Stevens, Roberts & Havell, which at present consists of Messrs. Frederick Stevens, James Roberts, and George Havell. Since its formation the firm has met with continued prosperity, and it is now among the largest of its class in the country, and in the manufacture of hardened steel goods they have no competitors.

As first established by Mr. Bishop, the business was confined to the manufacture of fancy steel goods, but succeeding the advent of the present firm new lines of production have constantly been added, until now the variety of goods made is not surpassed by any similar firm in the world. The staple products of the firm are special lines of saddlery hardware, shoe findings, fine steel skates, and articles for other manufacturers.

The third class named is almost entirely made up of the most improved styles of "Club" skates, and the manufacturers' supplies consist mainly of escutcheon pins, steel springs, &c. The items named, however, represent in no adequate sense the business of the firm, as aside from these they make portmonnaie, satchel and bag frames, trunk and bag trimmings, steel truss springs, &c., special attention being given to making models for the Government patent office, while an interesting feature is a variety of light hardware. Messrs. Stevens, Roberts & Havell, with that enterprise so necessary for success in their line, are continually making new styles of goods from unique and original designs. They are in no sense copyists, perferring rather to lead in perfecting novel and improved articles of ornament or utility to supply the wants of the public and the growing demands of the trade.

Owing to the varying state of the fancy goods trade, it is at times difficult to secure a sufficient number of skilled workmen to supply the demand. During a part of last season this firm employed a working force of 360 hands, now, however, owing to a depressed market, the force is reduced to 200 hands, one half of them being boys and girls between 14 and 18 years old. The weekly pay roll amounts to about \$1,800.

The articles made, from a brass button to the finest steel spring, are mostly produced by machines, and various mechanical devices, many of which are of the firm's own designs and manufacture. In this way they are fairly independent of others, except for the raw material. By means of these labor saving

machines, a very large production of the small wares made by this firm is rendered possible. Herein, doubtless, is the secret of success in competing for the home market with the foreign manufacturers; cheap labor is inferior to rapid machine work. To show the extent of Messrs. Stevens, Roberts & Havell's business, it is only necessary to state that even at the present rate of production the yearly product is valued at \$175,000. The firm occupies commodious quarters in Washington-st., near the business centre of Newark. The factories at present comprise six large buildings, and another is now in process of erection. Ample room has been provided for enlarging the firm's producing facilities as the wants of the country require. Goods are mainly sold to dealers in the metropolitan cities, and by them distributed to all parts of the Union. The results here recorded are alike a credit to the firm of Stevens, Roberts & Havell, and the city in which their wares are produced.

B. CONLAN & CO., 45 and 47 Lawrence-street. This firm was established in 1871, and is at present composed of Messrs. B. Conlan and J. O'Neil. The productions comprise all kinds of bag mountings and fancy brass goods. The manufacture of bag trimmings forms a considerable part of Newark's industries, and a fair share of the business is done by Messrs. Conlan & Co. They make all machines and dies required for new designs of goods, and a specialty is the manufacture of tools and models. Although recently started, they have an extended and constantly growing business. The present working force of the factory numbers 30 hands, and the weekly pay roll is \$325. The yearly production amounts to \$40,000.

JOSEPH M. L. GARDNER, 32 and 34 Mulberry-street. Mr. Gardner manufactures all kinds of brass stamp work, and makes a specialty of stove ornaments, together with die sinking. The business was established in 1840 by Mr. Joseph Gardner, father of the present proprietor. The usual working force of the factory is 12 hands, the weekly wages being \$125. The annual product is valued at \$15,000, and the goods are sold in all parts of the country. Mr. Gardner is about to increase his producing facilities, and begin a more extended business.

THE JOHNSON MANUFACTURING COMPANY, 32 to 36 Eagle-street. Many unacquainted with the business would be surprised to know how extensive is the use of sheet brass in the manufacture of ornaments and articles of utility, as they are almost endless in variety. New demands are constantly arising in order to suit the requirements of public taste. To supply this demand the above Company was organized in the autumn of 1873 with a capital of \$25,000. The officers are J. H. Johnson, President, and C. W. Harrison, Secretary and Treasurer.

The productions of the factory cover nearly everything made from sheet metal, comprising trunk, bag and door trimmings, buttons, buckles, &c. Unlike

most other enterprises, the Johnson Mfg. Company does not confine its efforts to any particular branch of trade, though particular attention is given to the manufacture of trimmings and mountings for trunks and bags, the production in this direction being very extensive. They also make escutcheons, corset clasps, covered nails and tacks, and "The Gaffney Patent Letter File and Binder." A large order for the last named article from the post office department at Washington was recently filled. In fact, the Company is prepared to manufacture any article which can be made from sheet brass or cast metal, and they thus cater to the wants of the trade. Their business has grown very rapidly and is continually increasing. It has already been found necessary to twice enlarge the producing facilities, and another increase is contemplated.

Their factory is one of the most convenient and systematically arranged establishments in the city. On the first floor the metal is received and stored, and the articles to be made from it are cut out by power presses and stamped by drop presses. They are then taken to the second floor, and there undergo numerous operations by foot presses: The soldering and polishing rooms are both upon the same floor, and in the latter apartment the work is prepared for nickeling, silver and gold plating, which are also done by an electric battery upon that floor. In another apartment they have all the tools made that are used in the factory, and in the die-sinking room they keep a man constantly employed in designing, sinking and cutting dies.

Under Mr. Johnson's able direction the prosperity of the Company will, no doubt, continue until the manufactory is among the first in the country. Eighty hands are now employed, and the weekly pay roll is \$600. At the present rate the annual production is valued at \$70,000. This, however, is hardly a criterion for the future operations of the Company.

NEWARK GAS BURNER MANUFACTURING COMPANY, 42 Mechanicstreet. With the introduction of illuminating gas it became necessary to devise economical burners for its use. Many styles of burners have been in use but the latest and most improved are made by the above named Company, which was established in 1872. Its officers are J. H. Judkins, President, and H. G. Avery, Secretary. They manufacture the patent self regulating valve-burner, which is the invention of Mr. H. G. Avery. This burner has unrivalled merits, and effects a saving of 25 or 30 per cent. in gas, with a greater illuminating power. It is so arranged as to adapt itself to different degrees of pressure in the flow of the gas. The firm owns and manufactures two other patents, known as the improved "peerless reflecting" and "new comet" burners. They also make adjustable burners for street lamps, common bat wing, fish tail, eccentric, and heating burners; drop light sockets, pressure guages, scotch tips, lava tips, &c. Four hands are employed in the factory, the weekly wages being \$50, and the annual production \$15,000. The business, however, is rapidly increasing as the merits of these burners become known.

RILEY & LYNCH, 15 Mulberry-street. It has already been shown how Newark has taken precedence over competing cities in the production of brass and metal fancy goods, small wares and those goods which go to supply the wants of other manufacturers. A principal feature of the last mentioned class is the manufacture of trunk and bag trimmings in all grades and styles. In this respect Newark has no competitors, all the trunk and bag trimmings required in the country being made in this city. The Newark manufacturers in this line are also foremost in the introduction of new articles of use and beauty to supply the needs of society and the demands of the trade. In fact, more than this is done, for in the introduction of many ingenious specialties a demand is both created and supplied, thus showing how keenly the leaders in industry appreciate public wants and necessities.

Prominent in bringing about the supremacy of Newark in these respects is the firm named above. The business was established in 1868, and is at present composed of Messrs. John M. Riley and Philip P. Lynch. That their business has grown to its present proportions in the short time of six years, shows how rapidly Newark has reached its great prominence in the direction indicated.

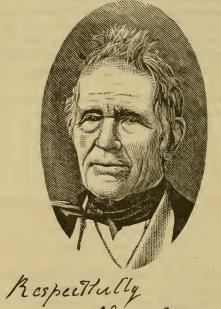
Messrs. Riley and Lynch give special attention to the manufacture of bag, umbrella and parasol trimmings and the various styles of military and masonic goods. It would be impossible here to give an adequate idea of the great extent and variety of their productions, as new styles and articles are constantly introduced. To enumerate even a small part of the different goods made by this firm would be impossible, comprising as they do a nearly endless variety. It is only necessary here to mention a general line of brass, silver and nickel-plated and gilt ornaments, book mountings, Gould's sash fastenings, and Hunt's patent window bolts. Special attention is given to the manufacture of patented articles-trying experiments and model making. They are sole manufacturers of Riley's Patent Foot Press, which has acknowledged and superior merits; they also make tools and dies to order. The machinery used in the factory is mainly of their own designs and inventions, workmen being constantly employed in devising and perfecting new and improved machines and tools, for either cheapening processes of manufacture, or perfecting the quality and finish of goods.

Messrs. Riley & Lynch employ 100 hands, and the weekly wages are \$1,100. At the present rate the production is valued \$150,000 per annum. The goods are sold in part to manufacturers in Newark and elsewhere, and the market for them extends generally throughout the country.

NEWARK'S GREAT INVENTOR. SETH BOYDEN,

Born November 17th, 1788.

Died March 31st, 1870.



Respectfully Soth Boyden

"Few men have lived lives of more unobtrusive usefulness, or been more regretfully remembered at death, than he."

TEA TRAY AND STOVE PLATFORM MANUFACTORY.

NEWARK TEA TRAY COMPANY, 395 High-street. The most interesting phases in the growth of a nation's industry, and especially of American manufactures, are the inventions, discoveries and better methods, whereby those things long in use are improved and perfected, or new ideas are shaped into articles of utility and ornament. A volume might be written of such revivals, as it were, of industrial activity, whose beneficial effects only require illustration to be fully appreciated. Many of these developments have had their origin and complete fruition in Newark, whose atmosphere is a great stimulus to inventive genius. Many of them have already been recorded in this volume, but more yet remain, and among the most important contributions to the industry of Newark and the country, are those which have resulted from the energy and inventive skill of Mr. Walter M. Conger, whose tea trays, stove platforms, etc., are manufactured by the above named Company.

Tea trays have long been a useful, and almost indispensable article of domestic economy, but, strange as it may appear, their manufacture was never successfully carried on in the United States, until the enterprise, whose success this article narrates, was conceived in the fertile mind of Mr. Conger, and by him carried forward to an industrial triumph. Previously, tea trays had been imported from England, where they were made by slow processes, their comparative cheapness being secured by the application of low priced labor. As is well known a characteristic of tea trays is their high finish, which comes from a peculiar japanning process. The glossy, mirror-like appearance of the japan coating was the result in the English tray of an after process, called polishing, the high lustre being imparted from a slow manual frictional operation on the surface of the tray. It was claimed by English manufacturers and the American importers, that only the medium grades of trays could be produced in this country; the low priced, and the articles of artistic designs and high finish must be left for the British artizans to supply.

Such was the situation when Mr. Walter M. Conger undertook a revolution in the manufacture of tea trays, which he has since fully accomplished. Valuable experience in the tin ware trade had shown him this void in the industry of the country; Americans were obliged to buy English tea trays or dispense with the article entirely. Mr. Conger, with rare skill, fertility of resource, and an energy which took no note of failure, determined to supplant the English tea tray in the American market. Although serious obstacles were in the way, he resolved to so improve manufacturing processes as to produce a superior and more highly finished article than was made in England, and at the same

time so cheapen the cost of production as to successfully compete with the low priced goods of British manufacture. The results are the best evidence of his success. He at once began experimenting, and his first important result was a signal triumph in applied chemistry, being the production of an improved japan, so much superior in quality that by a simple application to the surface of a tea tray with a brush, and undergoing a baking process at the required temperature, it would produce a gloss and lustre far excelling both in finish and durability the results of the slow and laborious method of polishing peculiar to English manufacturers. With this significant triumph as an initial point, during 1868, Mr. Conger began in Newark, the manufacture of American teatrays, not, however, without further difficulties to contend against. He had greatly exhausted his finances, and more capital was required to achieve the fullest success. In this respect he was exceedingly fortunate in securing the co-operation of Mr. John C. Johnson, a gentleman well known in the hardware trade of New York, and an honored resident of Newark; an active promoter of the city's Industrial Institute, and a citizen who is always ready with his means and influence to assist any meritorious cause, whose success would be an industrial triumph and a public benefaction. Mr. Johnson, with his discerning judgment, comprehended the situation at a glance, and saw, in a great measure, what would be the ultimate results of Mr. Conger's inventions and business energy. He, therefore, became a special partner in the business, and from that time the success of the enterprise was assured.

Following the perfection of the japanning process came the invention of machinery to take the place of the manual labor of England. And herein is the secret of America's industrial triumphs. Europe depends on pains-taking manual labor, for supremacy in the useful arts, while American artizans lead the world in devising labor saving machines, which will do the work of a thousand hands and in a better manner. In the former case great dependence is placed on physical drudgery, and in the latter, resort is had to intellectual work in devising suitable machinery; a machine, therefore, is cumulative brain work.

Although serious accidents intervened, the new industry flourished apace. In 1871 the Newark Tea Tray Company was organized under the laws of New Jersey, with the following officers: President and Treasurer, John C. Johnson; Secretary and Manager, Walter M. Conger.

A primary difficulty against which Mr. Conger had to contend in bringing the enterprise to the fullest success, was to secure sheet-iron for the trays, of the requisite fineness. At that time English sheet-iron was superior to the American article, but the former was far more expensive, and at the same time not up to the desired quality and fineness. Resort was had to American rollingmills, and after repeated trials Messrs. Rogers & Burchfield, iron manufacturers of Pittsburg, Pa., produced the standard quality necessary for making the best American tea trays. Thus is one industrial achievement but the precursor of

another. The Pittsburg firm mentioned is now making sheet-iron superior to to the best imported goods, the cost of production being far less, and they recently rolled the thinnest article of the kind ever made.

The Tea Tray Company has an extensive factory in High-street, but want of space prevents a detailed description of tea tray manufacturing as conducted by Mr. Conger, who personally supervises the work. The japan is made on the premises, the proper combination of materials being still a secret with its inventor, although he has been proffered thousands of dollars in return for revealing the process. Its general utility in the arts is doubtless very great. Mr. Conger has devised various ingenious methods for properly drying the japan, which is, perhaps, more accurately termed, an enamel. An interesting feature is the "wet room," wherein the mirror-like appearance of the enamel is more fully brought out. This room is kept darkened and very damp, thus creating an influence which completely negatives the tendency which particles of dust have for collecting on the bright surface of the enamel. The trays are at present shaped by a stamping process, and for this purpose the Company has the largest press in use for stamping sheet metal. A very ingenious labor-saving machine of Mr. Conger's invention, known as a Wiring Machine, is used for turning over and under the edge of a tray, in such a manner as to form a delicate roll, thus making a solid rim, and avoiding the necessity of hammering the edge of the iron around a wire, as trays are made in England. By a skillful device this lathe-like machine has both a circular and eccentric motion, thus providing for applying the process to oval trays. Many other economical devices are used.

Perhaps no single industry was ever established in so short a time as this. The enterprise was actively opposed by the importers for a time, and when this policy was of no avail, samples of Mr. Conger's goods, and the trade numbers, were sent to England that imitations might be made. The attempt, however, was a failure, the disguise was too transparent, and both the buyers and consumers in this country returned the articles to first hands. The importations of these goods to this country has almost entirely ceased, as the Newark Tea Tray Company fairly monopolize the home market. Mr. Conger has succeeded beyond all question in making the finest qualities of tea trays in the world, together with the most common grades, and all at a minimum cost of production.

The japan is unrivalled, and is so hard that a tray may be stamped upon without perceptibly injuring the enamel, which is also perfectly elastic, receiving no injury from the bending of the tray. Acids which ruin other japans in minutes, require hours for destroying that made by the "Conger" process.

The tea tray being one of the elegancies of civilization, it is probable that owing to the improved methods of manufacture it will come into almost universal use, which will be one among many benefits resulting from the inventor's mechanical skill and persevering energy. It is even probable that ere long the United States will have an exporting trade in these goods, when this Company

will supply tea trays to the world. In addition to the manufacture of tea trays, Mr. Conger has invented and patented several improvements in other household utensils, such as dust pans, children's trays, etc. His efforts in this direction have met with universal approval. His exclusive right to the patented child's tray has been disputed in the courts, but he has won at every point. The great English scientist, Herbert Spencer, truthfully remarked in one of his lectures that the common articles for household use now in vogue are seriously lacking in construction. In applying to these articles ingenious devices, the result being greater convenience, Mr Conger has accomplished a needed reform.

Not content with the results already shown, Mr. Conger's fertile brain has devised another domestic improvement, known as zinc stove platforms. Ever since sheet zinc was first made, the metal has been used, on account of its properties as a non-conducter of heat, for placing beneath stoves to protect the carpet and floor from fire. The plan of making tasteful platforms for this purpose from wooden frames covered with sheet zinc, and so cheap as to be handled by the trade, originated with Mr. Conger. The business as introduced by him has grown to extended proportions, and at the factory in High-street the platforms are made and shipped to all parts of the country. The framework is made of light wood in either circular or oblong form, and over these the sheet zinc is securely fastened. This Company now holds patents, which give them the monopoly of this class of goods for the United States.

The most wonderful part of this branch of the Company's business is the application of machinery in making the wooden frames, shaping the zinc, and combining the two in the finished platform. The peculiarity of these boards, which gives them their artistic effect, is a dome-like elevation, rising in regular gradations in the centre of the zinc. As at first manufactured, this elevation was produced by a stamping process. The effect, however, of so powerful and sudden pressure in the centre of the broad sheets of zinc, owing to the displacement of a portion of the metal, was to contract the outer and level rim, giving it a wrinkled, crimped and disfigured appearance, the same effect being seen in many of the articles known as stamped ware. Before the zinc could be used, this outer rim had to be annealed and rolled in order to reduce the inequalities of surface. Repeated annealing processes rendered the zinc too soft, and even when completed, the surface of the outer rim had a rough and inartistic appearance. The rolling process, also, was slow and expensive, and on this account the boards could not be brought into general use.

Appreciating these defects, and knowing that if not overcome, they would prevent the making of zinc stove platforms on a large scale, Mr. Conger determined to invent a machine which would overcome all the objections, and render their manufacture comparatively inexpensive. A machine was wanted which, instead of making the impression instantly with a stamp, would rather produce the required shape by what may be called a forming process, the work

being done swiftly but gradually, thus allowing the outer rim of zinc to retain a smooth and even surface. Such a machine, after several years of labor and partial successes, Mr. Conger succeeded in perfecting last November, and its signal success has exceeded even his own expectations. It is one of the most ingenious and valuable inventions of the age, it is known as a Forming Machine, its frame work having the shape of a letter G, and it differs primarily from a stamping machine in having only a single die—the lower one. On this die the sheet of zinc is laid very much as in an ordinary press. From the upper arm of the frame a circular iron crown of exactly the same shape, is pressed down on the outer rim of zinc, its purpose being to firmly hold the sheet of metal while the dome-like depression in the centre is forming.

The most wonderful part of the machine is the ingenious combination of mechanisms whereby the centre of the zinc plate is pressed firmly down into the die beneath. To describe the separate parts would require an engraving, but a general idea of the process will answer every purpose. From the centre of the frame projects an iron bar, which terminates in a line joining the ends of the main arms. This bar extends directly over the centre of the bed frame, and on its outer part is attached a movable carriage, through the centre of which passes downward a smaller iron bar, terminating in a steel roller, and when all is ready for forming the depression, this steel roller is in close contact with the zinc plate at a point which marks the outer rim of the depression. When the machine is in motion the bed revolves with great velocity, and the carriage referred to is carried outward and downward by a double motion, and in this way the steel roller is propelled toward the centre of the zinc, being forced by the discending motion to follow the depressions in the die. The zinc is driven downward beneath the wheel, and thus the shape of the die is repeated in the zinc. When the steel roller reaches the centre, by an automatic motion the carriage returns to the starting point. The zinc plate is then taken out, when the centre of the reverse side is a beautiful dome, while the outer rim remains intact. The machine will form about 2,000 plates of zinc per day, thus showing its great utility. With this machine a superior quality of what is known as stamped ware can be made. Mr. Conger is now perfecting it for that purpose, and thus is developed another extensive field of production.

In the wood-working department of the factory, Mr. A. B. Gunung, an ingenious mechanic, is of great assistance in devising new machinery and methods of manufacture. He is just now perfecting a very valuable invention in the shape of a saw for cutting irregular bevels on the outer rims of oblong wooden frames for stove platforms.

The demand for these goods, as well as for the tea trays, is rapidly increasing, and the industry is capable of almost unlimited expansion. Goods are sold to jobbers in the metropolitan cities of the Union. To show the great growth of the business it is only necessary to state that with the present working force

the annual production is valued at \$125,000. Sixty hands are employed in the factory, and the weekly wages are \$600. These statistics, however, are of little value in estimating the future business of the Newark Tea Tray Company, for their trade will expand as their productions become better known, and the wants of the country increase.

TIN AND PLANISHED WARE MANUFACTORIES.

JAMES, AIKMAN & CO., 96 to 102 N. J. Railroad Avenue; Warerooms, 25 Cliff-street, New York. It is interesting to note that tin, which is now of such general application in the useful arts, was known to the ancients, its utility having been discovered almost with the dawn of recorded existence. Homer, in his writings, mentions this metal as then in use for the exterior of shields, and also for weldings in the construction of armor. Not, however, until the sixteenth century, when the process of making sheet metal from tin was discovered, was its general utility for domestic purposes appreciated. About this time the celebrated tin mines, of Cornwall, England, and soon after other extensive deposits in the same country were discovered, and from these the principal supply of tin is still received.

The great use of tin at the present time in manufacturing articles of domestic economy, is well known to all. It is of value, however, to know those manufacturers who have been most instrumental in devising new and improved utensils made from tin, for domestic and other purposes.

In the various lines of production, manufacturers are often in advance of public tastes, the truth being that a demand is often both created and supplied. Especially is this true in the manufacture of tin ware for house-furnishing and general use. American manufacturers, appreciating the requirements of society, have continually produced new and improved methods of supplying these wants, and the results are evinced by the almost endless variety of articles made from sheet tin for utility and ornament, and in this way the ingenuity, skill and enterprise of manufacturers have resulted in public benefactions.

Occupying a first place in this regard is the firm of James, Aikman & Co., at the location named above, and whose predecessors in the business, Messrs. N. E. James & Co., began in Newark the manufacture of tin-ware during 1834, and are thus, perhaps, the oldest in the country, having been pioneers in their line. The present style was adopted in January, 1873, and the firm is now the largest manufacturers of tin and japanned ware in the United States.

At the date of their first efforts, tin-ware was almost wholly made by the tradesmen, known as "tinners," and the articles thus produced were seriously lacking in construction, and therefore deficient in convenience and ornament. This firm has so far succeeded, that at the present time the supplies of tin ware for domestic and other uses are produced in extensive factories and sold to consumers by the trade. In this way a superior article is furnished at a material decrease in the cost of production, and while other firms have followed their example, the house of James, Aikman & Co., is entitled to the main credit for these beneficial results. Their success has come from a fertility of suggestion in devising more convenient and beautiful articles, and a willingness to adopt every acquisition and appliance that would materially promote the trade and add imperishable improvements to an already valuable art.

Their factory in Newark is the largest of its kind in the country. In its outfit of machinery and every detail it is on a par with the leading houses of Germany, France and England. The most skillful workmen are employed, many of their artizans being the best in the country, and in this way the highest results are attained.

To mention in detail the varieties of styles of goods made by the firm would be impossible in this brief article. Perhaps the most important, however, is the stamped ware now so much in use, its excellence being greatly due to their efforts and inventions. In plain tin-ware also, their stock is complete, and an important feature is a superior grade of japanned ware in the most elegant designs and beautiful finish. Their stock of planished and burnished ware is unsurpassed. The manufacturing processes which give the superb finish of these goods, as carried on at the factory in Newark, are unexcelled by any similar concern in the country. The durable qualities and high finish of the goods are everywhere acknowledged. The beautiful styles of wire goods made reflect great credit on the ingenuity and skill employed in their production, the tinned wire used has great durability and much the appearance of silver. The varieties of the last named articles range from a tiny tea strainer to the more expensive luxury of a highly finished wire caster.

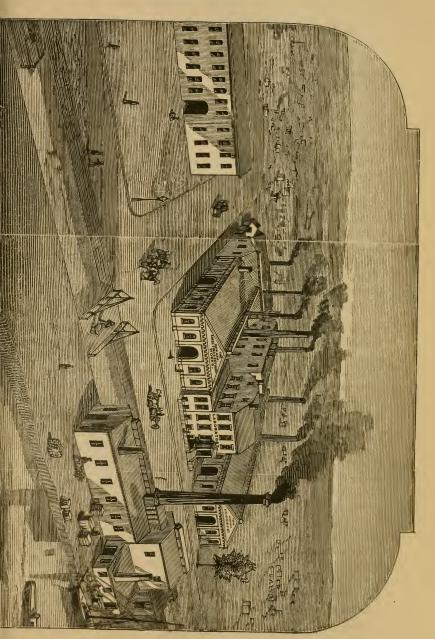
The salesrooms of this firm in New York occupy an entire five-story building at 25 Cliff-street. It is one of the most complete and best arranged concerns of the kind in the city; here are stored the immense productions of the factory before being shipped to dealers in all parts of the country. The firm keeps in store a complete line of tinners' trimmings, such as wire cloth, solder, perforated tin, block tin, &c. Sales are made to the trade throughout the United States, and their unrivalled goods are exported to South America. The people of Newark have cause for congratulation that through the efforts of this firm their city's industrial supremacy is still further established.

A. TURNER & CO., 24 to 32 Essex-street. This firm began the manufacture of tin and planished ware in Newark during 1863, under the style of Bayley, Musgrove & Turner, which was continued until 1868, when the present firm was organized, its members being Messrs. Alexander and William Turner. Through the introduction of labor-saving machinery improved methods of manufacture and careful business habits, their efforts have been successful and an extensive business is now done, the merits of Turner & Company's productions being generally acknowledged throughout the country. The firm has peculiar finishing processes whereby their planished and burnished ware is of superior quality. These goods have received the first premiums at the great Cincinnati Industrial Exposition, and the Industrial Fair at St. Louis, and they are mainly sold in the Western markets. Their display of goods at the Newark Industrial Exhibition of the present autumn is unusually fine, and reflects great credit on the energy and enterprise of the firm. Their stock of tin and japanned ware and house-furnishing goods in this line is quite complete, a specialty being stationers' tin ware. The usual working force of the factory number 50 hands, and the weekly pay roll amounts to \$450, the value of annual production being \$75,000.

J. E. PIMLEY, 72 Chestnut-street. This manufactory is another outgrowth of the inventive skill of Newark. The productions consist of patent transportation cans for varnishes, oils, &c. The superiority of these cans is generally acknowledged, and although of recent invention they are largely used by Newark manufacturers for shipping purposes, and will doubtless soon find a ready market in the principal cities of the Union. Five hands are at present employed, with a weekly pay roll of \$75. Being recently established, the value of annual productions cannot be determined.

LOCK MANUFACTORIES.

The ancient Egyptians used locks with iron keys to fasten doors. Sir Gardner Wilkinson describes one of these keys as having a shank five inches long, looped at one end for a handle, and bent around at the other. The latter end was furnished with three prongs to push into holes, moving away the tumblers that held fast the bolt. Other explorers of Egyptian ruins describe various other forms of keys. The principle of using tumblers to keep the bolt in place is thus of quite ancient origin. In European nations it has been used in rude forms



for ages. The lock-making trade, however, does not seem to have taken it up till about a century ago.

The oldest writing in which locks are mentioned seems to be the Book of Judges, (iii. 23.) Penelope is spoken of in Homer's Odyssey as opening a wardrobe with a very crooked brass key, ivory-handled. Metallic keys have been discovered in Great Britain as old as the occupation of that island by the Romans. Complicated metallic locks were found in the mud-covered ruins of the Roman city of Herculaneum, in Italy. The Chinese have constructed wooden locks with much skill.

As already intimated, the locks in common use till near the end of the last century had no tumblers; the bolts were simply shot backward and forward by the key. However, the accumulation of marketable securities in banks and counting-houses, and the increasing efficacy of the police in catching and imprisoning members of the criminal classes, led criminals to such ingenuity at lock-picking as to tax the wit of makers to defeat them. Love had laughed at locksmiths for untold cycles without improving their art, but organized and systematic robberies put them on their mettle. Since 1774 the race between lockmakers and lock-pickers has been very close; its results have shown that no mechanical contrivance will take the place of honest watchfulness, though it may greatly aid the conscientous guardian.

P. MEYER, 41 Mechanic-street. The productions of this factory are brass pad locks for railroads, stores, &c., which are used on ears, and for other purposes by several of the principal railroads corporations in the country. Four hands are employed, the wages paid weekly amount to \$50. The locks produced yearly are valued at \$5,000.

THOMAS SLAIGHT, 111 and 113 N. J. Railroad Avenue. Of late years the principal improvements in lock-making have been in the manufacture of pad locks, and of these, special varieties and designs have been introduced for railroad use. New patents and specialties are constantly being introduced by the manufacturers. Newark is now the principal point in the country in the production of all varieties and the better grades of railroad locks.

Prominent in this line is the manufactory named above. Mr. Slaight began in Newark the manufacture of brass pad locks in 1852, and the business has had a continual growth, until now he is perhaps the principal manufacturer in this line in the country.

The productions of the factory comprise all styles of locks for all purposes, the specialty, however, is a general line of railroad locks, comprising pad locks, for switches, freight cars, and ticket boxes; also stationary locks for freight and passenger cars. The former class are known as self-locking brass pad locks. Mr. Slaight has now twelve principal patents. The most wonderful, perhaps, is the last one, patented in January of the present year, and known as Master

Key Locks. These are rack tumbler pad locks, and are made with every key different, a master key being provided which will open all of them. This device, however, can be applied to other styles of locks. and is of great value in connection with door locks. Mr. Slaight is continually inventing new improvements in locks. Car latches, bell cord couplings, hinges, &c., are also made.

This is perhaps the largest manufactory of improved pad locks in the United States. The goods are sold over the whole country, and principally to railroads. An extensive trade is also carried on with South America. An important feature of Mr. Slaight's factory is the skillful workmanship required in the manufacture of these locks, and especially in making locks for prison use. Only the best mechanics are employed, and among them are many of the best artizans to be found in Newark. The present working force numbers 30 hands and the weekly pay roll amounts to \$500. The statistics, however, are no criterion for properly estimating the extent and importance of this business as conducted by Mr. Slaight, as owing to the financial depression and the consequent conservative inactivity of railway companies, the demand for these goods is comparatively light. With the present working force, however, the annual production is valued at \$110,000.

ROMER & CO., 141 to 145 N. J. Railroad Avenue. This manufactory was originally established in 1837, by Mr. H. C. Jones, who was the inventor of the double-acting switch and car locks, now so much in use. Mr. C. W. A. Romer was in the employ of Mr. Jones as foreman in the factory, and succeeded him in the business. Mr. Romer had successive associates until 1868, when Mr. J. N. Wilkins was admitted as a partner, and the present firm style adopted.

The principal productions of the factory are their improved pad locks, a specialty being the best prison locks. They also make builders' and bronze hardware, and a general line of piano and sewing machine locks. Goods are sold in every State of the Union, and are also exported to South America. The annual production of locks is fully 20,000 dozen of all kinds. The working force of the factory numbers 30 hands, and the weekly pay roll is \$400.

RITCHIE & SON, 15 N. J. Railroad Avenue. The business of manufacturing patent pad locks now conducted by the above firm was established in 1850, and has been known under the successive firm names of Ritchie & Boyden, H. Ritchie & Co., and S. C. Thomson & Co. The members of the present firm are Messrs. G. and Joseph H. Ritchie.

The productions of the factory are confined to railroad pad locks, and all goods made are of the firm's own patents. These locks are sold to the various railways of the country, but mostly to the roads of New Jersey and neighboring States The workmen employed in the factory numbers 10 hands, and the weekly pay roll is \$250. The yearly product of locks is valued at \$25,000.

M. HELMSTAEDTER, 83 Hamilton-street. The productions of this manufactory are improved piano, melodeon, and sewing machine locks, the annual value of which is \$5,000. Four hands are employed with a weekly pay roll of \$50. The goods are sold in the New York and near-by markets.

STAIR ROD MANUFACTORIES.

M. GOULD'S SONS, 65 Hamilton-street, Salesrooms, 96 Chambers-street, New York. Another instance of the growing demand for more highly finished and expensive articles, as illustrated by Newark's industries, is the manufacture of stair rods and stair plates. As with many other branches of industry the business has been revolutionized during the last thirty years, and this result has been reached mainly through the efforts of a single firm.

The manufactory conducted under the above style was established in 1832 by Mr. M. Gould, father of the present proprietors. Mr. Gould was thus a pioneer in what is now an important branch of American industry. At the time of commencing the work in 1832, the stair rods and plates in use were clumsy contrivances compared with the light and elegantly finished articles, which he was afterwards so instrumental in introducing. His efforts are the more commendable on account of the necessary inventions in the way of labor-saving machines which had to be invented before the business could be successfully attempted on a large scale. To Mr. Gould is due the credit of introducing the ingenious machines in the manufacture of stair rods, and many of them were of his own invention. Specially worthy of mention is the originality and good taste displayed in perfecting the manufacture of these goods and his success is another illustration of the truth that manufacturers, by their ingenuity and skill, often introduce articles of merit to the public favor, which are afterwards claimed as having originated through an appreciative public taste, whereas the contrary is true. After seeing a business, which he had developed by industry and business foresight, grow from a small beginning into large proportions, Mr. Gould died in 1869, and his sons succeeded to the business, the members of the present firm being Messrs. Wm. P. and Clarence P. Gould.

Under their direction the business will no doubt increase as the wants of the country require, and it is now by far the largest manufactory of the kind in the United States. The different styles of stair rods and plates made by the firm vary from the plainest and cheapest to the first quality and highest finish, and new and original designs are constantly being introduced. An extensive busi-

ness is also done in the manufacture of trunk and upholsterers' hardware. The working force of the factory numbers 90 hands, and the weekly pay roll is \$1,000. The value of yearly products is \$200,000. Sales are made in all parts of the country and goods are occasionally exported to Japan.

W. T. & J. MERSEREAU, Railroad Avenue. From a sign on this factory it was learned that the firm makes stair rods and brass goods. One of the courteous proprietors, however, in reply to inquiries, said that he wished the public not to know of the nature, variety, and extent of their productions.

ZINC WORKS.

Owing to the great prominence of zinc manufacture in the industries of Newark, the facts relating to the history and production of this metal possess peculiar interest.

Zinc is a whitish metal with a bluish gray tint like lead and in its natural state is brittle, breaking with a crystalline fracture. It is susceptible of polish, and when thus treated shows a metallic lustre. When heated to between 212 and 300 degrees F., Zinc becomes ductile and malleable, and can then be rolled into sheets or drawn into wire. It was not known to the ancients in a metallic state, but among the Greek and Roman metallurgists the various ores of zinc were used as an alloy in combination with other metals. The alchemists of those days regarded it as valuable for imparting a yellow, golden color to other metals. Partly on this account its development was retarded, as it was believed that by its use the baser metals could be transmuted into gold. It was first described and named in 1541. The first zinc works in England were built in 1743, though previously the metal had been brought from India, where it seems the process of smelting it from the ores originated. Spelter, the commercial name for zinc, is of East Indian origin. The metal is largely used in combination with copper and other metals for making brass, German silver, &c. It is also of great practical value when rolled into sheets, for roofing, the lining of tubes, and general sheathing purposes; as a chemical agency in generating galvanic electricity, and also for galvanizing iron. Its chemical compounds are of great use in the arts. The principal compound is the oxide, which is of great value in the manufacture of white paint, and its present utility and manufacture will be noticed farther on.

NEW JERSEY ZINC COMPANY, Foot of River-street; Transfer Office, 61 Maiden Lane, New York. The ores of zinc are known as calamine,—of which there are two varieties, silicates and carbonates,—blende, and the red oxide. The metal is obtained in Europe principally from the carbonate, and in the United States from the oxide, while blende is of little practical value. The red oxides of zinc are peculiar to this country, and are found principally in New Jersey.

The first zinc made in this country was smelted at the U.S. Arsenal at Washington in 1838, and was used in the manufacture of brass for the Government weights and measures. The production, however, was inconsiderable, and no successful efforts were made to utilize the vast stores of zinc contained in the red oxides of New Jersey until the organization of the above named Company in 1849. In the succeeding year the works were built in Newark, and the manufacture of zinc begun. The first efforts of the Company were confined to making the pure oxide or zinc white, for paint. In this they were very successful, the oxide being made direct from the ore.

The use of white oxide of zinc for paint was first suggested in France, and there its manufacture was begun. White oxide of zinc is an impalpably fine white powder, and is made by heating the ore or spelter to the point of combustion, when the oxide is given off in a light flaky powder. It is collected in flannel or muslin bags, and afterwards reduced to a solid state by high pressure. It is then prepared for use by being ground in bleached linseed oil. In Europe it is made direct from spelter. A smokeless fuel is required for its manufacture, and for this purpose anthracite coal is used.

The use of zinc as a white paint is now very general, and in France it is almost exclusively used for this purpose. It has qualities greatly superior to those of white lead, among them being its freedom from discoloration through the action of sulphuretted hydrogen. It is also quite devoid of those poisonous qualities which are peculiar to white lead. The production of the oxide, or zinc white, as begun by the New Jersey Zinc Company, has rapidly increased, and they are now the largest manufacturers in the country. The oxide as made by them is sold in a raw state, the grinding with oil being left for other manufacturers. The ore used by the Company is taken from their own mines at Ogdensburg and Franklin, in Sussex County, New Jersey. The deposits at these mines are very extensive, and are, perhaps, the most valuable of the kind in the world. A block of the ore weighing 16,400 pounds, was taken to the London Exhibition in 1851.

While the manufacture of zinc white is the Company's principal work, they are also largely engaged in making metallic zinc, or spelter. The smelting process used is known as the Belgian, and the product has an acknowledged reputation as the finest metallic zine in the world. Its value will be more fully seen when it is known that great difficulty has been experienced in getting a

sufficiently pure article of zinc for chemical purposes, and that the only perceptible impurity of the metal made by the New Jersey Zinc Company, is a slight trace of iron, though not more than one 19-1000 part of one per cent. On this account it is also very valuable for tubing and the manufacture of chandeliers. The efforts of the Company, in so far improving smelting processes as to produce metallic zinc chemically pure, are in every way commendable. They are important contributions to the industrial progress of America.

After the zinc has been extracted from the ore, a residue remains, which is largely made up of iron. This residue is smelted in the Company's blast furnaces, and the product is known as Spiegeleisen, which is a superior quality of iron, regarded by the consumer as almost unequalled.

It yields a bar iron of remarkable purity, fibre and strength, and is especially suited to the manufacture of steel. The pig iron produced is almost identical in character, appearance, and structure, with the best lamellar iron made from the famous spathic ores of Siegen and Musen in Germany. Its fracture shows large and brilliant silver-white lamellar facets, sometimes beautifully crystallized and so hard as to cut glass. Spiegeleisen is considered superior to German and Swedish iron, and is so hard that drilling it is almost impossible.

The present officers of the New Jersey Zinc Company are as follows: President, Edward Baker; Treasurer, A. H. Farlin. The productions of the Company are sold in all parts of the country, and are largely exported to Europe and elsewhere. The yearly capacity of the works is 6,000 tons of oxide of zinc, 1,300 of spelter, and 5,000 tons of iron, the whole valued at \$1,300,000. The present working force numbers 200 men, and the weekly pay roll is \$2,200, the present yearly production of oxide of zinc, spelter, and Spiegeleisen, being valued at \$600,000.

GOLD AND SILVER SMELTING AND REFINING WORKS.

ED. BALBACH & SON, (Newark Smelting and Refining Works,) 233 River-street. Gold was the first metal, whose use is recorded on the pages of history. In fact, the precious metals, both gold and silver, were in use long before the utility of the baser metals became known.

Previous to the discovery of gold in California, Russia was the chief source of supply for this metal. Gold is generally found in a metallic state, though the ores of gold are abundant.

Considering the importance of the precious metals, and their many uses, it is evident that the processes of smelting and refining form an important American industry, and in this direction Newark is one of the principal cities in the country. In fact, few, if any, American cities are equal to Newark in this respect. Great incentives to the business are, (1) the close proximity to New York, the great commercial mart of the country, and (2) the great consumption of gold by the manufacturing jewelers of Newark.

The representative house of this class is the firm of Ed. Balbach & Son, at the above location.

The house was established in 1851, and the senior proprietor, Mr. Ed. Balbach, had previously been engaged in smelting and refining the precious metals for many years. Later in the history of the firm the present style was adopted, when Mr. Ed. Balbach, Jr., was admitted as a partner. The last named gentleman has, by careful study and patient labor, made valuable additions to this important industry.

Heretofore great difficulty has been experienced in separating gold and silver when combined in small proportions with the baser metals, especially lead and zinc. The processes were so slow and expensive that the waste of precious metals was considerable. With admirable appreciation of these defects, Mr. Ed. Balbach, Jr. set about devising an improved process, whereby gold and silver, when occurring in small proportions with other metals, could be withdrawn and refined quickly and at a comparatively small expense. By the aid of valuable experience and scientific experiments, Mr. Balbach succeeded in 1864, and the result, known as the patent de-silverizing process has fairly revolutionized gold and silver smelting and refining in this country. With this method gold and silver are separated from the lead and concentrated.

Messrs. Balbach & Son receive mixed metals from the mines of Utah, Nevada, California, Mexico, South America and other mining regions. The metal is rereceived at the works in the ingot, weighing 120 pounds each, and the percentage of gold and silver greatly varies. The method of concentrating the gold and silver may be briefly described as follows: The first process is to drive off the zinc, of which every ingot contains three or four per cent. The metal is then run off into ingots, which contain nothing but chemically pure lead, with gold and silver. The gold and silver are extracted from this mixture by converting the lead into litharge. The gold and silver mixture is then subjected to cupellation in order to free it from any of the base metals which might remain. Then the resultant alloy being treated with acids all the silver is taken up, and the gold remains at the bottom of the vessel. The silver solution is then placed in a vessel with large sheets of copper, and the affinity of the acid being stronger for the latter than for the former metal, the copper is attached and the silver thrown down in a white powder. The metal is then melted and is either cast in bricks, or formed into feathery granulations by being thrown into cold

water. Gold is reduced only to the latter form, as it would be inconvenient for jewelers' use in solid bars.

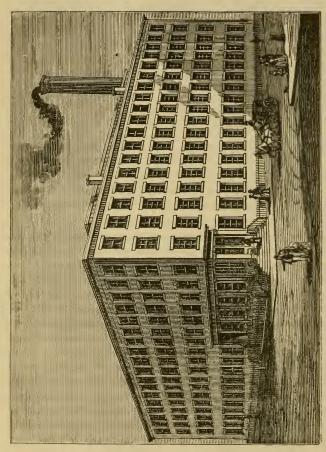
The simplified process invented by Mr. Balbach is now in use by nearly all the gold and silver smelting works of the United States, and he has also patented the invention in Europe. The smelting works of this firm cover two and one-half acres of ground, and are the largest in the country with one exception. In addition to the mixed metals received, ores from various mines, jewelers' sweeps, &c., are smelted, and general refining and assaying work is done. About \$40,000 worth of gold and silver is refined each week, and the product of lead for the same time is one hundred and fifty tons. The force employed in the works numbers 125 hands, and the weekly pay roll is \$1,500. The yearly production of these immense works amounts to five million dollars. The justly earned reputation which Messrs. Balbach & Son now enjoy, is no small part of Newark's fame as an industrial city.

C. S. DENNIS & SON, 38 and 40 Walnut-street. The establishment of this firm dates from 1865. They are smelters principally of mint sweepings, and their business in this direction is very large, ten tons per week being the average. Their process is similar to that already described. The value of annual business done reaches one million dollars, and ten hands are employed with a weekly pay roll of \$200.

L. LELONG & BROTHER, Halsey and Marshall streets. Assaying and refining for manufacturers of jewelry, and the smelting of jewelers' sweepings form an important feature in the industry of Newark. The firm of L. Lelong & Brother was established in 1858, and they have done much to bring to perfection this branch of business. They own and occupy an imposing structure, situated at the above location, 54×100 feet, four stories in height, which was built by them to accommodate their rapidly increasing business. At these works may be found all the most improved machinery necessary for the largest operations. This house refines everything containing gold and silver, and their business extends to all parts of the country. Sweep-smelting is made a specialty, and all the productions of the works are pure gold and silver. The processes used by the firm are original with them, and are a great saving of labor, but six hands being employed. The weekly pay roll is \$100, and the value of yearly business done reaches the large sum of one million dollars.

MARGOFF & JONES, Maple Place, Green-street. This firm was established in 1872, and at the present time gives employment to four hands.

The firm whose name heads this article has already built up a trade which extends to many parts of the country, and the value of annual productions reaches the sum of \$50,000. An extensive business is also done in sweep-smelting for Newark jewelers, and the weekly pay roll amounts to \$90.



CARTER, HOWKINS & DODD'S JEWELRY MANUFACTORY, MULBERRY AND PARK STREETS.

JEWELRY MANUFACTORIES.

From the earliest times the delight in personal decoration, which is common to all men, has resulted in devices of various kinds for gratifying these desires. The barbarian has his rude and clumsy ornaments, the Indian his crimson war paint, and the cultured Caucasian his fine gold jewelry and precious stones. Each is expressive of the same idea, alike in kind, only different in degree. The use of rare and costly jewels, and ornaments of silver and gold in decorating the person, is to gratify man's aesthetic nature; an outward expression, however, rude or imperfect, of the Art idea.

The art of making jewelry from the precious metals was one of the first at which mankind arrived. From the relics of the art, preserved in the world's museums, much light is thrown on the progress of civilization in different ages. From the polished and engraved bones worn as ornaments by the dwellers of the lake cities, up to the quaint but exquisitely worked golden jewelry of the Etruscans and Romans, the growth of the art can be traced, and from their methods of personal adornment the different characteristics of the various nations can be studied quite as well as in their architecture. Stores of trinkets worn by the Egyptians, the Assyrians and the Babylonians have been found, and are now carefully preserved.

The Greeks and Romans carried the cultivation of Art to the highest degree of perfection. Their ideal, however, was a complete whole, a harmony of beautiful lines and forms, and a full realization of their aspirations was a faultless human figure, the divine Apollo or the goddess Minerva wrought in soulless marble. In contemplation of the Art idea they gave comparatively little attention to industrial development, and although jewelry making is more closely allied to Art than any other mechanical industry, the manipulation of the precious stones and metals for purposes of ornament, has reached its highest development in modern times, and is only an incident in the great industrial activity of to-day. Modern mechanical skill delights in complex and intricate forms, and herein is the cause of the artistic design and finish displayed in modern jewelry, which is the result of mechanics, science and art combined. No branch of industry is more replete with interest than jewelry making, which requires for the fullest success an immense capital, and the highest talent and mechanical skill.

While the styles of jewelry worn are continually changing, each nation has its peculiar designs, and methods of working the precious metals and stones into those products of the jewelers' art which attract the critical gaze and aesthetic admiration of modern culture and refinement. The jewelry made in England is lacking in artistic effect, as might be expected from the purely practical ideas which prevail there. On the other hand, the French jewelry surpasses the English article in delicate design and finish, its main defect being a tendency to tinsel and glittering show.

Until the last quarter of a century the jewelry worn in the United States was in the main imported from Europe, and principally from France. Now. however, the supply of jewelry required in this country is mainly produced in American workshops, and for superb quality, design and excellent finish, is unequalled in France or elsewhere.

Newark has long been known as the principal American city in the production of fine jewelry. The manufacture of the common varieties of jewelry is left for other cities, Providence, R. I., being noted in this respect. While a demand still exists for imported jewelry, it is more fictitious than real, being the result of a supposed superiority of imported goods, or rather an ill-founded prejudice against "home productions." This prejudice is now happily fast disappearing, and will soon cease altogether, when the American article will be sought for in preference to the products of European workshops. While the popular notion prevails that the best jewelry comes from France, the facts are that the goods sold by such firms as Tiffany & Co. of New York, and the fashionable establishments of Boston, Philadelphia, and other large cities, often under the guise of foreign importations, are mainly the product of American workshops. American jewelry is now unrivalled for elegance and originality of design, superior finish and durability. While it is generally thought that the new styles of jewelry are designed in Paris, the contrary is correct, the truth being that they are mainly introduced by Newark manufacturers. Through the efforts of such firms as Durand & Co. of Newark, in the importation of precious stones, and the perfecting of diamond setting, American jewelry manufacture has reached so high a standard that it is probable an exporting trade in this line will yet be brought about.

As in most other lines of industry wherein American artizans excel, the reasons of their success in jewelry making are found in the application of steam power to manufacturing processes, and the use of ingeniously devised tools. Jewelry making in Europe is carried on almost wholly by hand, the processes being slow and laborious, and notwithstanding the cheapness of labor, far more expensive.

Jewelry manufacture proper was begun in Newark about 1832, at least the oldest establishment now in the trade dates its existence from that time. The business rapidly grew, and since then, perhaps, the best industrial talent of the

country has been centred here, the most skillful European workers in gold and silver who come hither having found employment in Newark factories.*

THOMAS W. ADAMS & CO., 83 Union-street; Salesroom, 14 John-street, New York. This manufactory was established in 1850, and the members of the present firm are Messrs. Thomas W. Adams and H. C. Ostrander. Their productions consist of bracelets, rings and sleeve-buttons, which are sold to jobbers generally throughout the country. The number of hands employed is 60, and their weekly wages are \$900. The annual production of jewelry is valued at \$100,000.

ALLING, BROTHER & CO., 12 Orchard-street. This firm, although classed as enterprising and public spirited, failed to see any beneficial results either to themselves or their city's industries, from the publication of manufacturing statistics, and therefore refused the necessary information.

JOSEPH C. ALLING, 85 Columbia-street. The statistics relative to this manufactory were unobtainable, not being at present in operation.

JOHN H. BENTLEY, 359 Mulberry-street. The courteous proprietor of this manufactory in reply to inquiries, said that he has "no sympathy with the publication of manufacturing statistics," and declined any information.

BARNET BROS. & POWELL, 74 Lawrence-street; Salesroom 196 Broadway, New York. This manufactory has been conducted under the above style since 1873, and the members of the present firm are Messrs. D. H. & W. H. Barnet and J. H. Powell. The productions are principally fine gold rings, sleeve-buttons and studs, including stone work. Sales are made in the metropolitan cities of the Union. Twenty-five hands are employed, and the weekly pay-roll is \$300, the annual products being valued at \$75,000.

^{*} The facts relating to the manufacture of jewelry are necessarily incomplete, on account of the extreme reserve of several firms, who seem to regard the publication of industrial statistics as of no value; doubtless forgetting that whatever conduces to the prosperity of all is beneficial to each manufacturer. Those firms which have fully stated facts and figures have shown an appreciation of the benefits to be derived from the publication of accurate information concerning their city's progress in the useful arts. To show the gross inaccuracy of the statistics heretofore gleaned, relative to this and, perhaps, other branches of American industry, it is only necessary to refer to the U.S. Census Report for 1870, which gives the total annual production of jewelry in New Jersey as \$3,315,679, whereas quite that amount is made by three Newark firms alone. Again, the total number of firms in the State is given in the Census as 39, though for several years Newark alone has had between 50 and 60 jewelry manufactories. If these defects fairly illustrate, as seems probable, that part of the Census relating to manufactures, the inefficiency displayed in its compilation is obvious. From trustworthy sources the statistics of the remaining jewelry manufactories have been carefully estimated, and the results, added to the facts directly obtained, give the total yearly production of jewelry in the city of Newark as \$6,130,000.

DANIEL W. BAKER, 65 Hamilton-street; Salesroom, 196 Broadway, New York. The specialty of this manufactory is fine gold rings, in plain finish and with cameo, topaz, amethyst and other settings. The business was established in 1867. The factory gives employment to 12 hands, and the weekly pay-roll is \$150. The value of annual productions is \$-------, and sales are principally made to New York jobbers.

BURCH, DEMOTT & COUGHLIN, 359 Mulberry-street; Salesroom, 9 John-street, New York. This manufactory was established in 1869 under the style of Dougherty, Burch & Co. The present firm was organized in 1871, and its members are Messrs. George Burch, James DeMott and Charles A. Coughlin. The goods made by this firm are principally solid sets, sleeve-buttons, studs, lockets and scarf pins; the standard of fineness being 14 carat throughout. Twenty-five hands are employed, the weekly pay-roll being \$375, and the value of annual product is \$50,000.

THOMAS G. BROWN, Marshall and Halsey streets; Salesroom, 192 Broadway, New York. This house is the oldest in the trade, having been established in 1834, and thus its history has been almost continuous with the growth of jewelry manufacture in the United States. The usual working force is 100 hands, with an annual production of \$300,000, though at present the force is cut down to 75, the weekly wages being \$1,000, and the yearly product \$125,000. With the revival of trade the accustomed activity will be resumed. A specialty is made of lockets, sleeve-buttons, studs and bracelets, and all of solid gold, the lowest standard being 14 carats fine. Sales are made generally throughout the country.

J. C. BIOREN & CO, 19 Green-Street. This firm makes jet studs and children's ear-rings. Ten hands are employed and the productions are all sold to New York jobbers. The weekly pay-roll is \$130, and the value of annual product \$25,000.

BALL & BARNARD, 1 Franklin Court. Futile efforts were made to secure the statistics of this manufactory, a member of the firm uncourteously refusing their business card, or information of any kind.

COE, ADAMS & STEVENS, 97 Garden-street; salesroom, 9 Maiden Lane, New York. This manufactory was established in 1869. A general line of jewelry is made, a specialty being lockets. About 15 hands are employed, but the remaining statistics were refused.

CARTER, HOWKINS & DODD, Mulberry and Park streets; Salesroom, 1 Bond-street, New York. Previous to the last half century jewelry manufacturing was mainly carried on by many individual concerns usually known as silver or goldsmiths. The growth of large factories employing hundreds of workmen has been the growth of comparatively recent years. By the aid sof

large capital and well directed energy in the employment of skillful labor these results have been accomplished, and in these large factories a better article of jewelry is now made, and at a less cost of production. This tendency has reached its fullest development in Newark and is well illustrated by the manufactory of Messrs. Carter, Howkins & Dodd. This house was originally established under the style of Carter, Pierson & Hale nearly a quarter of a century ago. The present firm, consisting of Messrs. Aaron Carter, Jr., William Howkins, David Dodd and A. K. Sloan was organized in 1864. The firm is acknowledged as the largest manufacturers of jewelry in the world. For Newark to be thus distinguished is a just cause for municipal pride. Their productions comprise nearly everything in the way of fine gold jewelry, and the firm's qualities of gold are 14 and 18 carats fine. The 'special articles of manufacture are lockets, crosses, broaches, ear-rings, chains and bracelets.

A detailed description of this extensive manufactory would possess great interest, but the allotted space does not permit. The gold used at the factory is received in ingots, varying in weight from 120 to 130 ounces, and in fineness from 997 to 999½. The first operation is preparing the necessary alloys, after which the metal is transformed into plates and wires of the required degrees of fineness. An interesting feature is the method adopted for preventing the waste of precious metals. By the utmost care the loss of gold in mechanical operations is reduced to a minimum, nothing is allowed to go to waste, the sweepings of the floors, the brooms that sweep them, and the workmen's aprons are saved and sent to the sweep smelters, and even the water used by the workmen in washing, is filtered through several thicknesses of cotton, thus collecting the fine particles of gold.

The working force of the factory numbers 500 hands, and the weekly payroll reaches \$6,000. The yearly manufacture of jewelry amounts to \$2,000,-000. By means of their extensive operations, this firm has done much to decrease the cost of jewelry manufacture, and their great success is a bright page in the history of American industry.

COEYMAN & MORGAN, 61 and 63 Hamilton-street. This manufactory was established 15 years ago, and the members of the present firm are Messrs. Henry G. Coeyman and Henry T. Morgan. They give special attention to the manufacture of fine jet and gold sets; also, sleeve buttons and rings. The principal markets for these goods are New York, St. Louis and Chicago. Twenty hands are employed in the factory, the weekly wages being \$250, and the value of annual products \$50,000.

COE, ADAMS & STEVENS, 97 Garden-street. This firm is engaged in the manufacture of a general variety of fine solid jewelry, and was established in 1869. Twenty hands are employed, with a weekly pay roll of \$250. The annual value of productions was refused, but has been estimated and incorporated in the figures given on page 149.

COLTON & CO., 50 Walnut-street; Salesroom, 14 Maiden Lane, New York. This firm makes a general variety of fine jewelry. Thirty hands are employed, and their weekly pay roll amounts to \$360. The value of annual production is \$50,000.

DURAND & COMPANY, 49 and 51 Franklin-street; Salesroom, 9 Maiden Lane, New York. As already shown, the high quality of American jewelry has mainly resulted from the efforts of Newark manufacturers, and in this direction the house of Durand & Company occupies a first place. The business was established a quarter of a century ago by the senior member of the firm, Mr. James M. Durand. At that time the supply of fine jewelry was mostly imported, as the amount made in this country was inconsiderable. Mr. Durand brought to the business untiring energy, together with the originality and skill of a genuine artist, and he has now the satisfaction of seeing the house of Durand & Company, everywhere acknowledged as preëminent in the production of fine jewelry. The present firm was organized in 1853 and its members are Messrs. James M., Wickliffe B. and Wallace Durand and Joseph G. Ward.

Messrs. Durand & Company are among the largest importers of precious stones, and in the manufacture of fine diamond sets they are unrivalled. Their standard quality of gold is 18 carats fine. In addition to the general line of jewelry a fine quality of gold watch cases is made by this firm. They are foremost in originating and introducing new styles of jewelry, and their productions are mainly sold in the metropolitan cities of the East.

The reputation enjoyed by this firm is not made in a year, and it is not the result of chance, but of slow and laborious plodding at first, of fixed system all the time; of a careful, vigilant and constant attention to all minor details; of superior skill in design and workmanship, and the use of nothing but the best of material. By continually adhering to a high standard of excellence they have done much to improve the quality of American jewelry in general, as other manufacturers have followed their example. Messrs. Durand & Company have greatly improved American taste in this regard, and their success has been an important triumph in American industry. Among the jewelry manufacturers of the United States they are first in excellence, and perhaps second in amount of productions. The working force of the factory numbers 125 hands, and only the most skilful artizans are employed. The weekly pay-roll is \$2,000, and the annual productions are valued at half a million dollars.

M. DENMAN WILBUR, successor to Wilbur, Beam & English, 61 and 63 Hamilton-street. At this manufactory are produced fine gold lockets exclusively, the standard fineness being 14 carats. Sales are made solely to jobbers. Twenty hands are employed, and the summary of weekly wages is \$300. The value of annual production is \$25,000.

DODD & HEDGES, 90 Mechanic-street. Upon application to this firm for the facts and figures relating to their manufactory, the reply received was that they had "no time to bother with any such matter."

H. ELCOX & CO., 23 Marshall-street; Salesroom, 21 Maiden Lane, New York. This firm began the business of jewelry manufacturing in Newark during 1867, and its members are Messrs. H. Elcox and F. H. Larter. They make a specialty of solid gold rings, though a general assortment of fine goods is produced. Although trade is depressed, 35 hands, the usual working force is employed. The weekly pay-roll is \$425, the yearly product being \$125,000. Goods are sold in the principal cities of the country.

THEO. J. ENGLISH & CO., 113 R. R. Avenue, corner Green-street. This firm is just commencing business under the above style, and consists of T. J. English and Alex. Milne, both of whom have long been known to the jewelry trade under other firm associations. Messrs. English & Co. propose to manufacture exclusively a fine quality of Roman lockets, which will be sold to jobbers in all the leading cities of the country. Being so recently established the statistics could not be ascertained.

FAIRCHILD, LYON & CO., 355 Mulberry-street; Salesroom, 12 Johnstreet, New York. This firm was established in 1869, and its members are Messrs. John H. Fairchild, Henry D. Lyon, and J. C. Fairchild. The products consist of a general line of solid gold jewelry, varying in quality from 12 to 14 carats. Twenty-five hands are employed, the weekly wages being \$400, and the yearly production is \$60,000.

FIELD & CO., 338 Mulberry-street; Salesroom, 8 Maiden Lane, New York. This house was established about 30 years ago, and is engaged in manufacturing rings, sets, necklaces, lockets, &c., the specialty of the firm being rings in general variety. One hundred and ten hands are employed, with a weekly pay roll of \$1,800. The value of annual production was respectfully refused. The figures relating to hands and wages as given above, seem somewhat excessive, but are recorded as they were received from the firm.

GENUNG & CO., 1 Commercial-street, (White's Building.) This firm was established in 1869, and is engaged in the manufacture of a general variety of medium grade jewelry, consisting of sets, rings, chains, etc., chains of all kinds being a specialty. The productions are sold direct from the factory to all parts of the country, and the annual sales are about \$40,000. Forty hands are given employment with a weekly pay roll of \$500.

GREASEN, HOLMES & CO., 335 Mulberry-street; Salesroom, 21 John-street, New York. The manufactory conducted under the above style was established in 1871. The quality of goods is 14 carats, and a specialty of the firm is beautifully colored Etruscan work. The usual force of the factory num-

bers 25 hands, the weekly pay roll being \$400. The annual production is \$75,000, and the goods are sold generally throughout the country.

HALL, MAXWELL & CO., 359 Mulberry-street; Salesroom, 2 Maiden Lane, New York. This manufactory was established in 1850, under the style of Alling, Hall & Dodd, and the present firm name dates from 1868. A general line of 14 carat gold jewelry is made, though a specialty is lockets and chain bracelets. Twenty-five hands are employed, the weekly wages being \$450, and the yearly production \$75,000.

HARTMAN, SCHUETZ & CO., 158 Oliver-street; Salesroom, 15 Maiden Lane, New York. The products of this factory are sets, lockets, chains, and bracelets, the standard quality being 14 carats. Eighteen hands are employed, the weekly wages being \$250, and the annual production \$50,000.

J. W. HAYES & CO., 922 Broad-street. This firm declined to furnish any information regarding the character and extent of their business, deeming the same "nobody's business but their own."

FERDINAND J. HERPERS, 18 Crawford-street. At this factory is made a specialty in the jewelry trade, namely, gold settings for diamonds and precious stones. Four hands are employed, and the nature of the business is such that the amount of the annual production could not be ascertained.

H. HOPPER, 8 Maple Place. The products of this manufactory are exclusively solid gold cuff buttons, the standard fineness being 12 carats. Fifteen hands are employed, the weekly wages being \$200. The value of yearly products is \$30,000, and sales are made principally in Boston, New York, Philadelphia, Baltimore and California markets.

A. JORALEMON & CO, 355 and 357 Mulberry-street. This firm was established in 1863, and consists of A. Joralemon and J. C. Mandeville. A general assortment of medium grade jewelry is manufactured and the goods are sold to jobbers entirely, and mainly in the New York market. Thirty hands are employed, with a weekly pay roll of \$400. The value of annual production is \$70.000.

KREMENTZ & CO., 14 Oliver-street. This house was established in 1864, and the present style was adopted in 1869, the firm being Messrs. Geo. Krementz and J. A. Lebkuecher. A general line of solid jewelry is made, the gold used being 14 carats fine. In response to inquiries the firm stated their working force as 110 hands, and the weekly wages \$1,500, but the value of yearly productions was refused, it has, however, been closely estimated, and will be found embraced in the general results upon page 149.

JOHN J. KYLE, Marshall and Halsey streets. This manufactory was originally established in New York, and removed to Newark during the present year. A general assortment of fine goods is made by Mr. Kyle. Fifteen hands

are employed, with a weekly pay roll of \$250. The value of yearly product is \$25,000, and the goods are mainly sold in the western markets.

CHARLES KRAUSS, 477 Washington-street. This factory was established in 1870, and the goods made are mostly fine gold chains, sets and rings. Fifteen hands are employed, the weekly pay roll being \$200. The annual product is \$25,000. Goods are sold to jobbers.

KENT, HOLDEN & CO., 42 Court-street; Salesroom, 196 Broadway, N. Y. This house was established in 1866, and the members of the firm are Messrs. Isaac Kent, George Holden and Stephen B. Kent. A general line of fine gold jewelry is produced, though a specialty is made of pins and sets. The fineness of gold used by this firm ranges from 10 to 18 carats. Twenty-five hands are employed, with a weekly pay roll of \$375, the annual product being valued at \$50,000. Goods are sold to jobbers in the principal cities of the country.

McINTIRE, CHAMPENOIS & BEDELL, Marshall and Halsey streets; Salesroom, 21 Maiden Lane, New York, The manufactory conducted under the above style was established in 1864, and the members of the present firm are Messrs. C. McIntire, Isaac Champenois, and H. Bedell. The firm produces a general line of solid gold jewelry, and the quality ranges from 12 to 16 carats, though any fineness is made to order. Special attention is given to the manufacture of fine bracelets and jet goods.

Seventy-five hands are employed, with a weekly pay roll of about \$1,000. The facilities of the factory require 125 hands, and with the revival of trade the full force will be employed. The usual yearly product of goods is \$200,000, though on account of the financial depression this is now reduced to \$150,000. Sales are made generally throughout the country.

MAYHEW, LEONARD & CARRINGTON, 19 Green-street; Salesroom, 16 John-street, New York. This firm was established in 1871. Their productions consist of sleeve buttons, studs, sets, rings, lockets, shawl pins, and the firm is prepared to make any desired styles to order. Sales are made generally throughout the country, from Boston to Texas, including California. The quality of gold used is 14 carats fine. Twelve hands are employed in the factory, the weekly pay roll being \$150. The amount of yearly product is included in the general summary. This firm, though of recent origin, has established among the trade of the country an enviable reputation for the excellence of their manufactures, both in style and quality.

MANCHESTER, BROWN & HOBBY, 46 Green-street; Salesroom, 21 Maiden Lane, New York. The jewelry manufactory known under the above style was established in 1865. The productions consist of rings, lockets, buttons, studs, crosses, &c., all varieties of rings being a specialty. Goods are sold in all parts of the country, and largely in the West. The statistics referring to the firm's business are published in the summary.

S. P. MOCKRIDGE, 63 Hamilton-street; Salesroom, 176 Broadway, New York. This manufactory is one of the oldest in the jewelry line, and dates its establishment from 1840. A general variety of goods are made, consisting of bracelets, lockets, &c., a specialty being Masonic jewelry, in which branch an extensive business is done. The annual productions are valued at \$125,000, and are sold exclusively to jobbers in the principal cities of the South and West. Forty hands are employed, and weekly wages to the amount of \$500 are paid.

MILLER BROTHERS, 47 to 51 Franklin-street; Salesroom, 11 Maiden Lane, New York. This manufactory has been conducted under the above style since 1854, and the members of the present firm are Messrs. James W. and Isaac M. Miller.

This firm is worthy of special mention on account of their contributions to jewelry manufacturing in the way of new and improved mechanical appliances, both as regards better machinery and ingeniously devised tools. They have spent thousands of dollars in perfecting improved methods of manufacture, and mainly for the production of the firm's specialties, which consist of fine gold sleeve buttons and a general line of initial and monogram work. The firm has, by their inventive skill and energy, so perfected this branch of jewelry making and cheapened the cost of production that they have scarcely any competitors in this line. Their superior tools and better methods of utilizing steam power have been important additions to this branch of American industry. The tools used are made in their own workshops. In addition to the specialties named, the firm also makes a general variety of jewelry of superior design and workmanship. About 55 hands are at present employed, and the weekly pay roll amounts to \$750. The value of annual production is \$150,000, and the goods are sold generally throughout the country.

NESLER & CO., 8 Maple Place. This manufactory was established 20 years ago, and the productions are sets, cuff buttons and studs, a specialty being jet goods. Twenty hands are employed, the weekly pay-roll being \$250, and the annual product of jewelry is \$40,000. The markets are in the principal cities of the Union.

OBRIG, DAY & CO., Marshall and Halsey streets. This firm was established in 1872, and is engaged in the manufacture of fine jewelry, consisting of sets, studs, rings, buttons, etc., which are sold in all the leading cities of the country. Sixteen hands are employed, with a weekly pay roll of \$200. The value of annual products being \$30,000.

WILLIAM RIKER, 42 Court-street; Salesroom, 5 Maiden Lane, New York. This manufactory was established a quarter of a century ago. A specialty is made of gentlemen's jewelry, the standard of quality being 14 carats. The statistics relating to the factory are incorporated in the general summary.

ROTHSCHILD BROS., 74 Lawrence-street. This firm was established in 1872, and its members are Messrs. Louis and James Rothschild. The goods made are mostly solid gold chains and bracelets, the quality being 14 carats-Sales are made to jobbers and dealers. Twenty hands are employed, and the weekly wages are \$250. The value of yearly productions is \$60,000.

ENOS RICHARDSON & CO., 52 Columbia-street; Salesroom, 23 Maiden Lane, New York. The gentleman in charge of this manufactory, in response to inquiries, declined to furnish any statistics, on the ground that it was not to the firm's interest to do so.

SHAFER & DOUGLAS, 61 and 63 Hamilton-street; Salesroom, 11 Maiden Lane, New York. This house was established in 1856 under the style of Shafer & Swinnerton, and the business was thus continued until 1867, when the present firm was organized, consisting of Messrs. Joseph H. Shafer and Frederick S. Douglas. They manufacture sets, sleeve buttons, rings, and a general variety of fine jewelry, and have done much to improve methods and processes of manufacture. Skillful mechanics are kept constantly employed in engraving on steel new designs and styles. Their markets are mainly in the Northern and Western States, though some goods are sold in the South. Thirty hands are employed in the factory, the weekly pay roll being \$400, and the value of annual production \$100,000.

SMILLIE, DORRANCE & EDGE, Maple Place. The establishment of this manufactory dates from 1853, and is one of the old jewelry houses of Newark. The productions of the firm consist of gold chains, hair chain trimmings, bracelets, opera and guard chains, &c. The goods are sold to jobbers throughout the United States, and are largely exported to Mexico. The statistics of this manufactory are included in the summary.

SHOEMAKER & DOUGHERTY, 51 Green-street. This firm makes sleeve-buttons, sets, and stone lockets, split and spring rings being a specialty. The goods are sold in the metropolitan cities, and the force employed in the factory numbers 20 hands, the weekly pay-roll being \$275, and the value of yearly production is \$50,000.

SWINNERTON BROS. & CO., 65 Hamilton-street; Salesroom, 196 Broadway, New York. This manufactory was established in 1856, and the present firm was organized in 1867, its members being Messrs. James, Jr., and Geo. W. Swinnerton and Alexis Petersen. They make a general variety of goods as sets, buttons, rings, etc., a specialty being jet goods. Filled work comprises a part of their productions. Markets are principally in the West. Twenty five hands are employed, and the weekly wages paid are \$300. The value of annual productions is \$60,000.

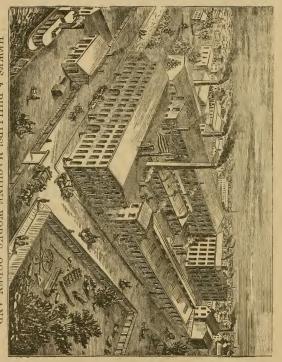
TINGLEY, SINNOCK & SHIRRIL, 23 Lawrence-street; Salesroom, 9 Maiden Lane, New York. This firm makes a specialty of solid gold rings with

stone settings, and the goods are sold in the principal cities to jobbers. Eighteen hands are employed, the weekly wages being \$225, and the annual production \$30,000.

VAN HOUTEN, SAYRE & CO., 45 Franklin-street. This manufactory was established in 1870 under the style of Van Houten Bros. A general line of solid gold jewelry is made, though a specialty is made of necklaces and sets. Twenty hands are employed, the weekly pay-roll being \$250, and the value of annual production is \$30,000. The goods are sold throughout the country, but mainly in New York.

WHEELER, PARSONS & HAYES, 922 Broad-street; Salesroom, 2 Maiden Lane, New York. This well known house was originally established in 1859, and occupies a first place in the jewelry trade of the country, both from extent of business and quality of manufactures. This firm, unlike others which produce a general variety of goods, believe that by a close application to the several branches of the trade, making each a specialty, better wares can be produced and the wants of the markets better considered; hence, the manufactures of the house are divided into three separate and distinct branches, (1.) chains; (2.) fine jewelry, consisting of sets, rings, sleeve buttons, studs, lockets, crosses &c., and (3.) watch cases.

The greater part of these goods are produced in Newark, the fine jewelry being manufactured here for the firm, by J. W. Hayes & Co., while the branch of chain making is also located here in the firm's own factory. At this manufactory are employed 40 hands, which is the full working force. The business has been very little effected by the general depression in the jewelry industry, as the standard reputation of the firm's goods is such as to at all times command a market. At Brooklyn, N. Y., another factory of the firm is located, in which is carried on the making of watch cases. Here are employed —— hands, and upwards of four hundred cases are produced each week. The style and workmanship of this firm's watch cases are regarded by the trade as the finest in the country. The annual productions of the Newark watch chain factory are valued at \$200,000, while the combined products of the firm are over one million dollars per year. Thus the extended business of Messrs. Wheeler, Parsons & Hayes comprises the operation of three factories, and their sales extend throughout the country to both jobbers and consumers.



HEWES & PHILLIPS' MACHINE WORKS, OGDEN AND ORANGE STREETS.

SILVER WARE MANUFACTORY.

JOSEPH B. MAYO, 58 and 60 Mechanic-street. This is the only manufactory in Newark, and perhaps in New Jersey, engaged in the production of fine silver ware. The business was established in 1868, by the present proprietor.

The products comprise a general line of silver ware, such as cake baskets, card receivers, castors, waiters, pitchers, spoons, forks, &c. The metals used are brittania, white metal and solid silver. Mr. Mayo makes the composition metals required, in his own factory. His goods have a standard reputation, and the business will doubtless increase into large proportions. A silver medal was awarded him at the last Fair of the New Jersey State Agricultural Society.

Mr. Mayo has shown commendable energy in producing silver ware of so high a quality. A specialty is made of the best plated ware. The goods are mainly sold in home and near-by markets. Eight hands are employed in the factory, and the weekly wages are \$90. The annual product is valued at \$15,000.

MANUFACTURES IN METALS OTHER THAN IRON —SUMMARY.

| Manufactures in metals, as above, of every kind 81 | | | | | | |
|--|-----------------------------|-----------------|--|--|--|--|
| Total | number employees | 2,685 | | | | |
| | amount of wages paid weekly | | | | | |
| | " wages paid per year | | | | | |
| " | value of annual productions | \$14,289,500.00 | | | | |

Comprising:-

| | | | | No. of employees | Weekly Wages. | Annual Production. |
|--------------------------------------|-----|--|----|------------------|------------------|-----------------------|
| Brass and Copper Wire and Wire Cloth | | | | | | |
| Manufactory | | | 1 | 33 | \$456 | \$125,000 |
| Plumbers' Brass Work Manufactories | | | 3 | 35 | 395 | 76,500 |
| Carriage and Harness Ornament | £ £ | | 4 | 36 | 480 | 78,000 |
| Brass and Metal Small Ware | 66 | | 6 | 426 | 4,000 | 465,000 |
| Lock | 66 | | 4 | 74 | 1,650 | 215,000 |
| Tin and Planished Ware | 4.6 | | 3 | 180 | 1,525 | 275,000 |
| * Jewelry | a | | 51 | 1,396 | 24,415 | 5,070,000 |
| Tea-Tray and Stove Platform | | | 1 | 60 | 600 | 125,000 |
| Silver Ware | 44 | | 1 | 8 | 90 | 15,000 |
| † Stair-Rod | | | 2 | 90 | 1,000 | 200,000 |
| Smelting and Refining Works | | | 4 | 145 | 1,890 | 7,050,000 |
| Zine " | | | 1 | 200 | 2,200 | 600,000 |

^{*} In this branch of industry the statistics of nine firms who refused information are not included. For estimated productions, etc., see page 149.

[†] The statistics given of stair-rod manufactories are those of M. Gould's Sons only, the figures of the other factory not being included for reasons named on page 141.

MANUFACTURES IN

IRON AND WOOD.

CARRIAGE MANUFACTORIES.

Carriage building as an art, and carried on in extensive factories, is of recent growth, though as a trade it is very much older. As a trade, strength in carriage building was due to great weight, other results being bulk and general unwieldiness, as is clearly shown by an illustration of the carriages used in the last century. As an art, the result is lightness, beauty, strength and durability, united by an intelligent and skillful combination of elements which science has suggested, and experiment proved to be the best adapted for reaching the end in view. The carriage of fifty years ago had little more in common with the phaeton or landau of to-day than that it ran on wheels. A comparison would amply justify the assertion that the art of carriage building has fully kept pace with the wonderful industrial advancement in other directions during the last half century.

The perfection of the art is combining the greatest possible strength and elegant finish with the least possible weight. Among the many causes, aside from the natural promptings of taste and refinement, which have stimulated men of inventive genius and skill to a laudable rivalry in the art which has resulted in the present nearness to perfection, has been the development of trotting speed in horses. The rapid speed which horses now attain, could never have been reached had they been compelled to draw the lumbering vehicles of 50 years ago.

To this country belongs the honor of introducing nearly all the improvements that have fairly revolutionized the carriage building trade of the world. American carriages have been largely purchased in Europe, and their advent there has exercised a great influence on foreign carriage builders, who are rapidly abandoning the old fashioned, heavy, and cumbersome vehicles for lighter, more graceful, and equally durable styles.

Newark was one of the first and foremost cities in perfecting the manufacture of American carriages. Even in the early part of this century her reputation for producing the improved styles of carriages was very great, and extended over the whole country, and even to Mexico and South America. One firm, mentioned farther on, was established in 1834, and is, with one exception, (an Albany firm), the oldest in the country in this line. Previous to the war the carriage trade of Newark was largely in the South, and in that direction alone was very extensive. A material decrease of business in that direction has resulted from the war, and the consequent impoverishment of the Southern country. With the improvement of affairs, however, Newark carriages will again be freely sold from Baltimore to Galveston.

Carriage building is, however, at the present time an important Newark industry. The business is perhaps, more unfavorably affected by the financial panic of last year, than most other lines of industry. Carriage builders deal in luxuries, and during financial depression their business is first affected. This branch of Newark's industries, however, is in a healthy state, and with the revival of trade it will resume its accustomed activity. The carriage makers of Newark are as a rule enterprising gentlemen who have grown wealthy through industry and economy. Their carriages are sold in nearly all parts of the world, and quite largely in New York and other metropolitan cities in the Union, and with the exertions sure to be made, the justly earned fame of Newark Carriages will become still greater in succeeding years. The people of Newark are exceedingly fortunate that, relative to so important an accessory of culture and refinement as the modern carriage, they have all that the most critical taste can require in the products of home manufacturers. For the most approved styles, thorough workmanship and elegant finish they have need to go no further than to Newark workshops, and a just municipal pride will result in buying only of home institutions. The firms named below are all worthy of honorable mention as having contributed to the supremacy of Newark in carriage building, though as will be seen, some are deserving of greater prominence than others.

J. COLYER & COMPANY, 229 to 235 Halsey-street; Salesroom, 598 Broadway, New York. This manufactory was established in 1840 by the senior member of the present firm, Mr. Joseph Colyer. It is thus one of the oldest in the country, and when the business was commenced carriage manufacturing in the United States was of slight importance as a distinct branch of industry. Mr. Colyer's efforts in developing the manufacture of carriages have been generally acknowledged. In 1864 the style was changed to J. Colyer & Co. by the admission of the son, Mr. John Colyer, as a partner.

The firm's productions are landaus, coupes and light carriages, special attention being given to the manufacture of sulkies, together with light road

and skeleton wagons. In these specialties the firm has an established and well-merited reputation. They have taken first premiums at the Fair of the N. J. State Agricultural Society and the St. Louis Industrial Fair.

Messrs. Colyer & Co., unlike their Newark competitors in carriage building, have commodious warerooms in New York for the convenience of their patrons in that city. The products are mainly sold in the home markets, though skeleton wagons are shipped to St. Louis and the West generally. Forty hands are employed in the factory, and the weekly wages are \$450. The value of annual production is upwards of \$75,000.

DOBBINS & VAN NESS, 23 and 25 Pearl-street. This firm began business in 1870, and its members are Messrs. Harvey W. Dobbins and James H. D. Van Ness. A specialty is made of light carriage work, and though recently started they have already earned a reputation for the manufacture of excellent work. They are building up an extended carriage trade, though their sales at present are mainly in the home market. The working force of the factory numbers about 15 hands, and the weekly payment of wages is \$175. The value of annual productions is about \$25,000.

GOLDER & POST, 227 Halsey-street. This manufactory was established in 1842, and is therefore one of the oldest in Newark. The firm has been unchanged for many years, and at present consists of Messrs. Abraham Golder and Cornelius M. Post. The history of the firm has been almost continuous with the growth of Newark's industries. Previous to the war their trade was largely in the South; since then, however, the good taste and excellent workmanship displayed in their productions have given them an extended market in other directions. The products of the factory are principally fine grades of light work, and the goods are sold in the home market, near-by cities, and occasionally carriages are shipped to California. The present working force of the factory numbers 25 hands, and the weekly pay-roll is \$325. The yearly productions are valued at \$30,000, but with the revival of trade this will be largely increased.

M. C. GREEN, 120 to 126 N. J. Railroad Avenue. This is one of the oldest carriage manufactories in Newark, and was established in 1846 under the style of Green & Co. During the past year Mr. M. C. Green, the senior of the old firm assumed sole charge of the business. The efforts of the firm greatly contributed to the early supremacy of Newark in carriage building. In the palmy days of Southern ease and luxury the carriages of Green & Co. were favorably known throughout the whole South and also in other parts of the country. Under the present management, however, the old prestige still continues, though for the time being the tendency of trade is in other directions. Mr. Green is not behind in the introduction of new designs, and his styles of rockaways, park and pony phaetons, are in every way superior. His trade is

still largely in the South, and extensive sales are made in New York, Brooklyn, and other near-by cities. A general variety of carriages is made, and about 50 hands are employed in the factory. The weekly pay-roll is \$550, the value of annual production being about \$75,000.

LEVERICH & ENDERS, 282 Market-street. This firm manufactures a general line of light carriages, though heavy work is sometimes made. The members of the firm are Messrs. John T. Leverich and William B. Enders. They have had long experience in carriage making, and their productions have an acknowledged reputation for finished elegance. Goods are largely sold in New York and Brooklyn. The working force of the factory numbers 25 hands, with a weekly pay roll of \$450, the yearly production of carriages being valued at \$55,000.

EZRA MARSH, 50 and 52 Bruen-street. The carriage manufactory conducted under the above style was established by Mr. Marsh in 1846. It was long a source of carriage supplies for the great Southern market, and now, when few goods are sold in that direction, the energy requisite for supplying the near-by and Western demand is not wanting, and Mr. Marsh's efforts are constantly in the direction of improved styles and better grades. He employs every opportunity for securing new and better designs, and these, together with originality and skill are sufficient to secure the highest results of the art. His carriages are sold in the home market, New York, Boston, and are also shipped to Mexico, the West Indies and Japan. The usual working force of the factory numbers 30 hands, and the wages paid weekly amount to \$400, the yearly products being valued at \$50,000.

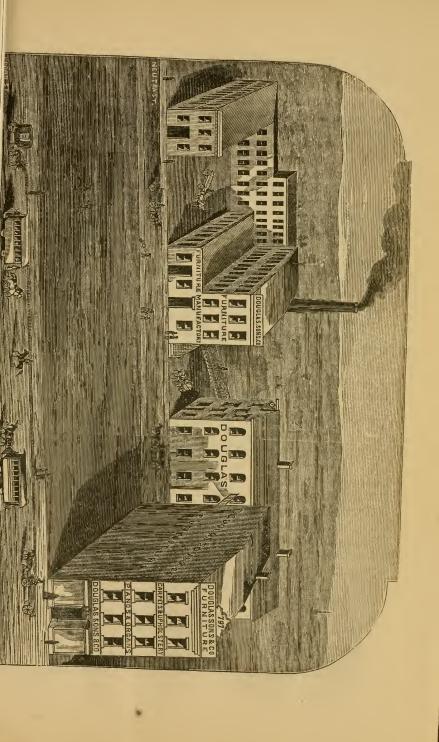
J. M. QUINBY & CO., 836 Broad-street. The firm now doing business under the above style was founded in 1834 by Mr. James M. Quinby, and, as allusion has already been made, it is the oldest house in the country, with one exception, engaged in the manufacture of fine carriages. The name of the founder, James M. Quinby is known and honored wherever the fame of American carriage making has gone. Few men have done more in the promotion of a single branch of American industry than he as a pioneer in carriage manufacturing. Previous to starting in business he had served a full apprenticeship, and his intimate knowledge of carriage building, thorough workmanship, and inventive skill were no doubt largely due to his early training. Commencing when the business was in its infancy, by a concentration of energies in one direction, aided by persevering industry, he was enabled to attain a high standard of excellence. The results of his earnest efforts were a great incentive to others, and thus his exertions and influence did much toward bringing the American carriage to its present high degree of perfection. He was also ever ready to adopt the improvements of others, and was always eager to test the merits of new inventions, and the high reputation of

his work showed how well he kept up to the progressive spirit of the age. During his business experience Mr. Quinby had several associates, though from 1834 until the present, the firm name has remained unchanged. In July of the present year Mr. Quinby died, after many honorable years of usefulness and profit to his fellow men. The Harness and Carriage Journal paid an eloquent tribute to his memory, and, on the day of his funeral, the carriage factories throughout the city of Newark were closed as a token of respect and honor.

By the death of the senior Mr. Quinby, the firm was dissolved. As reorganized, however, the style remains as before, and the members of the present firm are Messrs. James M. Quinby, Isaac S. Ayres and John H. Jephson. The first named gentleman is a son of the founder, and he inherits much of his father's business foresight and persevering energy, and each of them was identified with the old firm in one capacity or another for years, thus showing a valuable experience which is so important in the direction of an extended manufacturing enterprise. Under their efficient management the business will no doubt continue to increase and prosper. In fertility of resource and inventive skill, so essential in carriage making, they are well qualified for carrying forward a work so well begun. The manners and customs of society are changing so rapidly that successful carriage making greatly depends on the introduction of new and more artistic styles. In this connection, to show the superior claims of J. M. Quinby & Co., it is only necessary to mention of the firm Mr. Isaac S. Ayres, whose rare skill in draughting improved designs of carriages is everywhere acknowledged.

The firm manufacture every description of vehicles, from a light road wagon to a clarence, coach, or landaulet, and none but the most skilled workmen are employed. Only the best grades of goods are made, and they are sold in all parts of the country, and largely in New York and other metropolitan cities. Sales are also made in South America and Europe. The present working force of the factory numbers 100 workmen, and the weekly wages are \$1,365. The yearly production of carriages is valued at \$130.000. With the general revival of business this will be largely increased.

S. B. SANDERS, 246 Market-street. The products of this factory are light carriages and sleighs. Mr. Sanders has been in the business of fine carriage making for many years and has won a repution for thorough workmanship, and careful attention to public tastes and requirements. About 25 hands are employed in the factory, the weekly pay roll being \$400. The goods are mainly sold in the home market, and the value of annual productions is \$35,000.



CHILDREN'S CARRIAGE MANUFACTORY.

COLE & BALLARD. 200 to 208 Academy-street. Of late years, the production of children's carriages and sleighs has been a prominent part of American industry.

The point of excellence has been to combine extreme lightness and elegance with durability and strength. In securing these results the firm named above has been prominent. It is the only manufactory of the kind in Newark, and is the largest one in New Jersey. The firm dates from 1870.

A specialty of the firm's productions is the patent "phaeton" spring earriage. These earriages have a fine appearance, and are the best of their kind, combining elasticity and strength. They also manufacture sleds, velocipedes, wagons, etc. During busy seasons the firm makes 20,000 carriages, and their trade extends to all parts of the country. Fifty-five hands are employed, with a weekly pay roll of \$600. The value of annual productions is \$75,000.

HEARSE MANUFACTORY.

TURNBULL & GUMERSELL, 17 and 19 Mechanic-street. The productions of this firm consist entirely of hearses, and it is the only manufactory in the country manufacturing this class of work exclusively. The business was begun as early as 1817, by James Turnbull, father of the present senior partner. In 1847 the style was changed to Jas. Turnbull & Son, and the present firm name dates from 1856, the members of the firm being Messrs. Alex. Turnbull and R. Gumersell, Jr. By careful attention to the details of the business, selection of the best material, and thorough workmanship, the firm has earned a reputation for producing the best hearses made in the country. It is obvious that a firm which gives special attention to a single line of business can attain to higher results than those who attempt to cover the whole field of production. The hearses made by Messrs. Turnbull & Gumersell are

sold in all the metropolitan cities of the Union, and are occasionally exported to Europe. The working force of the factory numbers 30 hands, and the amount of weekly wages is \$450. The annual productions are valued at \$75,000.

WAGON MANUFACTORY.

BRANDEBURGH & NOVELLE, 9 to 13 Crawford-street. This is the only concern in Newark, and one of the largest in New Jersey, engaged solely in the manufacture of wagons for an extended market. The business was established in 1855, and the members of the present firm are Messrs. Geo. A. Brandeburgh and John Novelle. The products of the factory comprise grocers', bakers', express, and business wagons, etc. The wagons made by this firm have a standard reputation and are largely sold in the West and South, and even as far West as California.

The firm's manufacturing facilities at the factory in Crawford-street are ample, but on account of the present business depression, the working force is materially reduced. The number of hands is 25, and the weekly wages \$375, the value of yearly productions being \$65,000.

AGRICULTURAL IMPLEMENT MANUFACTORY.

THE NEW YORK PLOW COMPANY, Foot of River-street; Office, 55 Beekman-street, New York. Plows, as originally used in Egypt, were made of the limbs of trees, and in that country the same kind of plow is in use to-day. The plow still in vogue in Palestine is made entirely of these sticks, so adjusted as to support each other. Improvements in the manufacture of plows were very slow, and not until the present century, were the perfections of the present day fully foreshadowed.

One of the first to improve the plow in this country was Thomas Jefferson, who, in a communication to the French Institute, attempted to solve the mathematical problem of the true surface of the mouldboard. Previous to 1830 the improvements in this branch of industry were many and valuable, and among

the first organized efforts to manufacture plows on an extensive scale was the Peekskill Plow Works, at Peekskill, N. Y., organized in 1826, the New York Plow Company at the location named above being their successors in the business. The works were removed to Newark in 1869, and are one of the principal industries in the city. The officers of the Company are as follows: President and Treasurer, J. B. Brown; Secretary, John W. Douglass; Superintendent, John Pentreath.

Perhaps no other organization, so far as regards the manufacture of necessary implements is concerned, has been more closely identified with the agricultural development of the country than this. As the Peekskill Plow Works, it was foremost in bringing the American plow to perfection, and the Company, in the early years of its history, had scarcely any rivals in supplying the East, and the West as the latter developed, with the best products of American workshops. And, under its present proprietors the styles and methods of manufacture are so perfected, and the facilities of production are such, that the Company's plows, and their other agricultural implements are sold in nearly every State in the Union. To supply the varied peculiarities of soil and climate which are found in so extensive a market, over 1,000 different styles of plows are manufactured, and constant additions and improvements are making.

The New York Plow Company have been foremost in creating a demand in foreign countries for American plows and agricultural implements. In this direction they have done much to maintain and enhance the supremacy of American industry. Their trade extends over the whole of South America, and is rapidly increasing in Spain, Austria, Germany and Russia. The productions comprise plows, plow castings for manufacturers, feed cutters, cider mills, a great variety of agricultural implements, and iron castings. About 3,500 tons of iron are annually required in manufacturing processes. The force employed at the works numbers about 200 hands, the weekly wages being \$2,000. The yearly product of plows, castings and general implements is valued at \$300,000.

MANUFACTURES IN IRON AND WOOD. SUMMARY.

| Manu | factures in iron and wood of every kind | 12 |
|-------|---|------------|
| Total | number Employees | 620 |
| 4.4 | amount of wages paid weekly | \$7,535 00 |
| 4.4 | " wages paid per year | 391,820 00 |
| 4.5 | value of annual production | 990,000 00 |

Comprising:

| | | | | No. of em- ployees | Weekly Wages. | Annual Production. |
|---------------------|------------|-----|---|--------------------------|------------------|-----------------------|
| Carriage Manufactor | ries | | 8 | 310 | \$4,115 | \$475,000 |
| Children's Carriage | Manufactor | ies | 1 | 55 | 600 | 75,000 |
| Hearse | | | 1 | 30 | 450 | 75,000 |
| Wagon | " | | 1 | 25 | 375 | 65,000 |
| Agricultural Implem | nent " | | 1 | 200 | 2,000 | 300,000 |

MANUFACTURES IN WOOD.

WHEEL AND CARRIAGE WOODWORK MANUFACTORIES.

PHINEAS JONES & CO., (Newark Wheel and Spoke Works,) 301 to 307 Market-street. The present high state of perfection in manufactures has only been possible through diversified industry. The manufacture of many articles of utility has been facilitated and the cost of production lessened, by means of a division of labor. Scarcely any branch of industry better illustrates this fact than the manufacture of carriages and wagons. Thirty years ago the various parts of a wagon or a carriage were made in one manufactory, the same set of hands producing all the parts. It has already been shown in this volume how the separate manufacture of springs and axles has facilitated and improved carriage building. This division of labor is now more fully applied to the wood work of wagons and carriages, the truth being that the operations of carriage manufacturers of to-day mainly comprised in uniting and finishing the work of other factories.

The most important industry which has resulted from the division of labor referred to is the manufacture of wheels, spokes, and wheel stock in general. As a separate line of trade, wheel making was begun in this country about 1840, as special machinery was then first employed to improve and expedite the work. Previously the various processes necessary for forming the perfect wheel were carried on by carriage makers in their own factories without the aid of machinery. At that time spokes and felloes were made entirely by hand, and to produce one set of wheels was considered a week's work for one man. Through the introduction of labor-saving machinery, the business is now completely revolutionized.

As indicated, the first efforts in this direction were made in 1840, and by S. G. Reed of Massachusetts. With him in the early and experimental stages of the industry, Mr.E. J. Whittemore served an apprenticeship from boyhood, thereby obtaining a thorough knowledge of the business. With his valuable experience to aid them, Mr. Whittemore and Mr. Phineas Jones began the manufacture

of wheels at Elizabethport, N. J., in 1855, under the style of Whittemore & Jones, and thus was established the business now conducted in Newark by the firm of Phineas Jones & Co., who are perhaps the largest mannfacturers of wheels and spokes in the United States. In 1856 Mr. Whittemore withdrew from the firm, when Mr. Jones became sole proprietor. Four years later, in 1860, he was joined by Mr. William H. Baldwin. In the same year the present style was adopted and the works removed to this city, and thus was Newark made a chief source of supply in this important branch of industry. The business of the firm increased so rapidly that it soon became necessary to provide better manufacturing facilities, and in 1864 they built the present factory, which was afterwards considerably improved and enlarged, and it is now one of the most extensive manufacturing establishments in Newark. During 1867 Mr. E. J. Whittemore rejoined the concern as a partner, and has since had charge of the manufacturing department.

The business of this great firm now plays a prominent part in the carriage industry of the country. Although the labor saving machinery in use at the date of the firm's organization was considerable, many improvements and additions have since been added. These new machines and devices have been a main cause of the firm's preëminent success, and nearly all of them have resulted from the genius and skill of the senior partner, Mr. Phineas Jones, whose efforts have greatly contributed to the importance of Newark as a manufacturing centre, and have also resulted in important additions to American industry. With a just appreciation of the conspicuous part which industrial developments perform as an element of modern civilization, he regards with peculiar pride the City of Newark, whose carnest men, by their inventive skill and untiring energy, have made important and permanent contributions to the supremacy of American manufactures.

The firm are now extensive manufacturers of finished wheels for all descriptions of wagons and carriages, and also the parts of wheels, known as wheel stock. They keep constantly in store for the trade a stock of 500,000 spokes, in all widths, 10,000 sets of rims, and about 15,000 sets of hubs. The firm's productions are regarded as unsurpassed in the country, and superior facilities enable them to so cheapen the cost of production that the firm of Phineas Jones & Co., has few, if any, successful competitors in their special line. A prominent feature of the business is the manufacture of an improved wheel, of Mr. Jones' invention, and known to the trade as the Jones' Patent Wheel. It is protected in the centre by a strong iron band, having the requisite holes for the spokes, and this band being forced upon and into the wood by powerful pressure, the hub is secured from the remotest possibility of breaking. The merits of the Jones' Wheel are strength, economy, durability and elasticity, and it is protected by letters patent granted in 1872–3. Its superiority is such that it is

rapidly growing in public favor, the truth being that its points of excellence are unrivalled. Sales are principally made to manufacturers, though some goods are sold to the trade. The working force of the factory numbers 45 hands, and the weekly summary of wages is \$700. The number of employees is small on account of the labor saving machinery used. The annual production of the factory is valued at \$175,000.

WM. JAMES & CO., (Newark Coach Hub Manufactory,) 142 Summit-street. This house was established in 1853, under the style of Wm. Miles & Co. The present firm was organized in 1871, and its members are Messrs. Wm. James and Wm. Felts.

The firm manufactures morticed hubs exclusively, in all varieties, and the works are the largest of the kind in the United States. The woods used are oak, elm and pepperidge, and the timber required is all cut within 100 miles of Newark. The grade of timber used and the improved methods of manufacture are such that the firm's goods have an acknowledged reputation throughout the country for excellence of material and superior finish. The hubs made by Messrs. James & Co., are sold in all parts of the country, and a large exporting demand also exists. The sales are mostly made to dealers, and the high standing of the firm is the best guarantee as to the quality of productions. The working force of the factory numbers 30 hands, and the weekly pay roll amounts to \$400. The value of annual productions is \$50,000

WM. STEVELY & CO., 159 Summit-street. This house was established about 15 years ago, and the members of the present firm are Messrs. Wm. Stevely and Wm. James. The productions comprise a general line of wagon and carriage woodwork, consisting of all varieties of wheels, rims, spokes, poles, shafts, bows, &c. The standard quality of these goods is everywhere acknowledged, and there is an active demand for them from all parts of the country. And in addition the firm has an important exporting trade. Thirty hands are employed in the factory, and their weekly wages are \$400, the annual production being valued at \$75,000.

S. O. CRANE, 256 Market-street. This factory was originally established in 1864, and in 1868 Mr. Crane became sole proprietor. The manufacture of wheels of every description is made a specialty. Nothing but the first quality of material is ever used by Mr. Crane, and hence his goods are well and favorably known to the trade. The number of hands employed is seven, only a small working force being required owing to the large amount of labor saving machinery used. The weekly pay roll of employees is \$\$125, and the value of annual productions is \$30,000. Goods are mainly sold to the home and nearby trade.

W. H. EGBERT, 226 Halsey-street. This manufactory was established in

1869, and gives employment to five hands. The productions are carriage and hearse bodies, which are sold in the leading cities of the country, and as far south as New Orleans. Seventy-five dollars per week are paid to hands, and the value of annual productions is \$6,000.

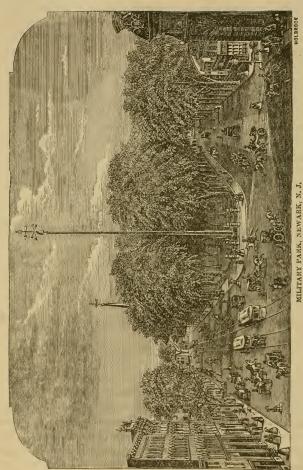
R. S. HEDENBERG, 83 Mechanic-street. Mr. Hedenberg commenced business in 1863, and is engaged in the manufacture of wheels exclusively, for all kinds of vehicles, steam fire engines, etc. Two men are employed, and the weekly wages amount to \$30. The value of annual productions is \$5,000, and sales are made in the home and near-by markets.

ISAAC B. KILLBURN, 88 Mechanic-street. This house, formerly known under the style of Bedford, Crane & Co., was established nearly thirty-five years ago. They manufacture a line of carriage wood work, such as carriage bows, bent felloes, shafts, poles, &c.; also, all kinds of carriage and sleigh timber. Extensive sales of these goods are made in the South and California, and they are also exported to various countries. In addition, Mr. Killburn sells largely to the best New York carriage makers. Fifteen hands are employed in the factory, and the weekly pay roll amounts to \$250, the value of annual production being \$40,000.

P. H. VROOM, (Phœnix Spoke Works), 46 and 48 Lawrence-street. The production of carriage wood work is made a specialty at this manufactory, and the goods are sold mainly to dealers throughout the country. This house was established in 1860, and its products have an established reputation and are well known to the leading carriage manufacturers of the several States. Sixteen hands are employed, the weekly pay roll being \$300. Carriage wood work is produced annually to the amount of \$30,000.

WOOD FAUCET MANUFACTORY.

JOHN SOMMER, 8 to 12 Pearl-street. The manufacture of cork-lined wooden faucets was commenced by Mr. Sommer in Newark in 1862, he being the first in this country to produce this class of goods. The commencement was in a small way, and for some time but little progress was made in the introduction of the cork-lined wooden faucets, but Mr. Sommer, with commendable energy, created a demand for his wares, and now 300 dozen and upwards of these faucets are made per day. Mr. Sommer has so controlled the market of the country that only two firms in all are engaged in the manufacture of cork-lined wooden faucets in the United States. Twenty-five hands are employed in the factory, their weekly wages being \$400. The total valuation of annual products is \$40,000.



STEP-LADDER MANUFACTORY.

D. G. GRIFFITH, 84 McWhorter-street. At this manufactory is produced a variety of house furnishing wooden ware, consisting of skirt, bosom and pastry boards, foot benches, flower stands, snow shovels, &c., a specialty being Griffith's improved step-ladder. This ladder is simple in construction and is produced at a nominal cost. It is considered to be the best ladder of the kind in the market, and the demand for it is rapidly increasing. The productions are sold principally in the New York market to jobbers. Three hands are employed, and the weekly wages are \$50, the value of yearly products being \$12,000.

SASH, BLIND AND DOOR MANUFACTORIES.

The manufacture of sash, blinds and doors as a part of Newark's industries, is of no small importance, both as regards the quality and quantity of productions. In this direction this city is the source of supplies for a large area of country. The articles in this line as made in Newark, have an admitted standard of high quality. Newark sash and doors are sold throughout the South, and in all the principal cities from Baltimore to Galveston. A large business is done in New York city, and an exporting trade is carried on with Australia.

F. CALLAWAY, 6 to 10 Comes-street. This manufactory was established in 1827, and its productions are a general line of sash, blinds and doors, a specialty being fine hard-wood doors. The hands employed number 40, and the weekly pay roll is \$500, the value of annual productions being \$85,000.

S. T. GUERIN, 88 to 92 Hamilton-street. The manufactory known under this style was established in 1854. The products are sash, doors, blinds and mouldings. Twenty hands are employed, and the weekly pay roll amounts to \$325. Sales are mostly made in the home markets. The annual productions are valued at \$75,000.

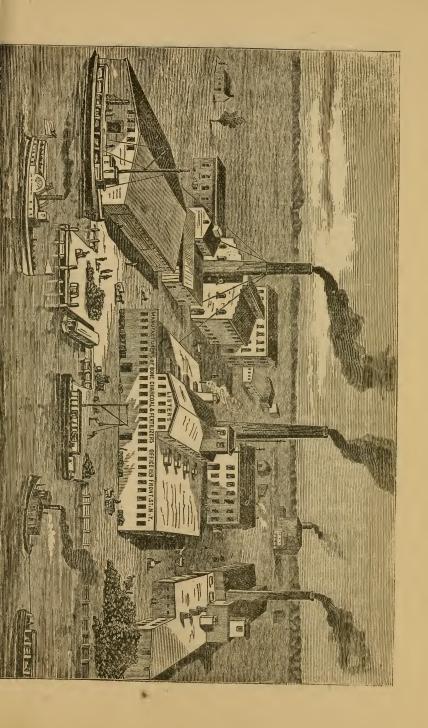
WILLIAM KING, M. & E. Railroad Avenue and Plane-street. This manufactory was established in 1854, and the productions comprise sash, blinds and doors, together with wood and paper boxes. In the manufacture of the three first named goods, Mr. King has few equals, and his concern is among the

largest in the State. Sales are mainly made in the home and near-by markets. The working force numbers 120 hands, and the weekly pay roll is \$1,400, the value of annual productions being \$160,000.

MEEKER & HEDDEN, Ogden and Orange-streets. This well known manufactory was established in 1852 by Messrs. J. J. Meeker and V. J. Hedden under the above style. The concern is now the largest of its kind in the State, and its growth in so short a time to such immense proportions, has only been possible through the business energy and perseverance of the proprietors. The business of the firm comprises the manufacture of sash, blinds, doors and trimmings; church, bank and office furniture, together with general building operations. The finest goods are made, comprising hard wood doors, &c. Scroll and ornamental sawing, wood turning, &c., are also carried on. The manufactured products are sold in Newark and New York, the Southern and Cuban markets. The yearly production of their goods is valued at \$800,000. Three hundred hands are employed, and the weekly pay roll amounts to \$5,000, or nearly \$1,000 per day. Should the building operations be included in the result given, the total business of the firm would reach \$1,600,000 per year. The factories are among the largest manufacturing establishments in the city, and they cover two and one-half acres of ground.

WIGHTMAN & BROTHER, 37 to 43 Academy-street. This house was established in 1827 by Wm. H. Wolf. The business was continued under successive firms until 1864, when the present style was adopted, and the firm now consists of Joseph H. and Daniel C. Wightman. The productions comprise sash, blinds and doors of the first quality, in which respects the firm excels. Mouldings are made to order. Sales are largely made throughout the South, in Georgia, North Carolina, and from thence to Texas. In addition to the firm's domestic trade, goods are shipped to Australia. The hands employed in the factory number 55, and the weekly wages are \$1,000, the value of yearly productions being \$125,000.

WARD, HUNTINGTON & DUNHAM, (New Jersey Molding and Planing Mill,) Hamilton and McWhorter-streets. The productions of this factory are sash, blinds, moldings, builders' brackets, scroll work, trunk boxes, &c. The work done is generally for home manufacturers in other lines of production. The members of the present firm are Messrs. M. O. Ward, J. E. Huntington, and John Dunham. Twenty-five hands are employed in the factory, and the weekly pay roll is \$375, the value of annual production being \$50,000.



FURNITURE MANUFACTORIES.

It is no doubt true that no single branch of industry is more closely associated with the general advancement in culture, refinement and domestic economy than the manufacture of furniture. Scarcely anything more accurately indicates a nation's progress in civilization than the peculiarities and styles of furniture in vogue at any given time. And the general utility, convenience and elegance of the furniture now in use constitute valuable results of the general progress in the useful arts.

While the manufacture of furniture in Newark, as regards the amount of business done is not of so great importance as some other lines of industry it is deserving of special prominence on account of the excellence and high quality of the goods produced. The several firms named below fully supply the home market with the finer grades of furniture, and in addition they have an outside trade which extends to New York city and generally throughout New Jersey, and even to Washington, Richmond and other cities farther South. The business, however, is of no slight importance, for to supply the demands in this regard of Newark's culture and refinement, alone gives employment to a large amount of labor and capital. Citizens of Newark have the satisfaction of knowing that no better grades of fine furniture are made anywhere than in their own beautiful city.

JOHN JELLIFF & CO., 794 Broad-street. Perhaps the history of no single firm has been more closely interwoven with the progress of Newark in wealth, culture and refinement than John Jelliff & Co, furniture manufacturers. The business was established in 1836 by the senior partner, Mr. John Jelliff, and to his early efforts and strict adherence to a high standard of business integrity is due in a large degree the wide reputation which the firm now enjoys for the high quality and excellence of their productions. In few, if any, other lines of industry must the buyer depend so much on the representations of the manufacture. Even in the jewelry business the infallible acid will quickly tell that "all that glitters is not gold." Furniture can only be tested by time and use. It may have a fair and even highly finished exterior, while the material, not being properly seasoned, will soon become warped and valueless. Again, the upholstering may present a handsome appearance, while, for aught the buyer can discover, the supposed curled hair, is tow, shavings or worse. Hence, the high character and integrity of a firm are the only guarantee of perfect material, and that the faithfulness of the upholsterer's work has only been excelled by the skill of the joiner, carver and finisher.

The business as established by Mr. Jelliff was continued by him as sole proprietor until 1854, when the present firm was organized by the admission as a partner of Mr. Henry H. Miller, who had in the same establishment during the previous eleven years, successively held, under Mr. Jelliff's direction, the position of apprentice, workman, salesman and bookkeeper. Through integrity of purpose, and continuance in well doing he had so won the confidence of his employer that the promotion referred to was a just reward for years of patient industry. In 1860, owing to ill health, Mr. Jelliff was compelled to retire from active work, and since then the business has been under the direct management of the junior partner, Mr. Miller. From that date, through his energy and the counsel of Mr. Jelliff, the business has increased more than three-fold.

The firm's productions comprise parlor, library, dining room and chamber furniture of all descriptions, from medium grades to the most expensive and highly finished products of the art. All the processes necessary for completing the finest furniture are carried on in their own factory under the immediate supervision of Mr. Miller. Thus is full assurance given that only the best material and methods are employed. This firm is specially noted for the manufacture of fine office furniture, and ample evidence of their superior work in this regard may be seen in the various banking and insurance offices of Newark, which are noted for their superb furniture and interior arrangements. They also excel in the manufacture of elegant mantle and pier glasses, cornices, lambrequins, etc.

The factory is one of the best appointed concerns of the kind in the country, and to show its extent it is only necessary to state that the firm's business requires more than 40,000 square feet of floor room, and further enlargements are now underway. Messrs. Jelliff & Co.'s business mainly consists of fine custom work, and fully one half of the sales are made outside of Newark, and largely to citizens of New York city. And there is scarcely a town or city in New Jersey wherein their productions are not favorably known. In addition, sales are made in Washington, Richmond and farther South The working force of the factory numbers 45 men, and the weekly summary of wages is \$700, the amount of annual business being \$100,000.

DOUGLAS, SONS & CO., 797 Broad-street. The furniture manufactory and warcrooms known under the above style was established by the senior proprietor, Mr. William B. Douglas in 1842. The business has met with a continuous growth, and now they are among the most extensive furniture manufacturers in New Jersey. Previous to his beginning the present business Mr. Douglas had, by valuable experience both as workman and foreman, learned all the details of furniture manufacturing. He had secured what is so necessary, as an element of success, practical experience,

and with this to aid him he established the business as above stated. The first efforts were modest in their way, but through an intimate knowledge of public wants and unusual energy the business increased so rapidly that in a few years more commodious quarters became necessary. The first location was at 65 Market-street, and in 1850, to secure increased facilities, the business was removed to 119 Market-street. Here it remained until 1860, when a removal was again made, and this time to the spacious warerooms and factory now permanently occupied at the central location 797 Broad-street, the fashionable thoroughfare of Newark.

Mr. Douglas was sole proprietor down to 1849, since which time several changes in the business occurred until 1871, when the present firm was organized, and its members are the senior proprietor, already referred to, his two sons, Horace B. and Theodore W. Douglas and Adolphus Kuhne.

The business as now conducted comprises the manufacture of furniture of every description, from medium grades to the most elaborate and expensive article for the chamber, dining room, library or parlor; also the finest pier and mantle mirrors in gilt-finish, cornices, lambrequins, etc. In the rear of the commodious salesroom are the extensive factory buildings, which are so provided with machinery and convenient arrangements as to secure the greatest results with the least possible outlay and labor. By thus improving the facilities of manufacture, Mr. Douglas has done much to cheapen the cost of fine furniture. Only the best material is used, and a large supply of the finer grades of lumber is kept in store that time may be had for the proper seasoning processes, which are so important in the production of perfect and durable furniture. The long standing of the house, and Mr. Douglas' well known integrity are a sufficient guarantee as to the uniform high quality of the firm's productions. From its inception Mr. Wm. B. Douglas has been the master spirit of the enterprise, and even now, after years of earnest effort, have resulted in an industrial triumph, he is still active, and although materially aided by his sons and Mr. Kuhne, he personally supervises the firm's extensive business.

A specialty of Messrs. Douglas, Sons & Co.'s business is the manufacture of improved step ladders for the trade. In addition to their regular furniture business the firm deals in carpets, oil cloths and kindred goods, and also in pianos and organs from well known New York and Boston makers.

The firm's markets are mainly in Newark, New York and near-by cities of New Jersey. The yearly products of the factory amount in value to \$50,000, though these figures represent in no adequate sense the total of annual sales; the furniture made in the factory, however, is continually increasing, and will soon comprise nearly the whole amount of furniture sold by the firm. The number of hands employed is 40, and the weekly pay roll is \$400. After many years of earnest effort Mr. William B. Douglas has now the justly earned satis-

faction of seeing the firm he was so instrumental in founding, a representative house among Newark industries. ullet

TURNER & BROWN, 85 Frederick-street. This manufactory produces a general line of furniture for the trade, consisting of bedsteads, tables, extension-tables, bureaus, cribs, cradles, etc. The market for these goods extends throughout the country. Twenty-five hands are employed, and the weekly summary of wages is \$200, the value of annual production at the present rate being \$30,000. The capacity of the factory, however, is a yearly product of \$100,000, and with the revival of trade this result will be reached.

WILLIAM HEMMER, Bloomfield Avenue and Morris canal. The manufacture of desks and office furniture was commenced by Mr. Hemmer many years ago and he is now the only one in Newark making a specialty of this branch of industry. The factory is of extensive proportions, three stories high, and supplied with the most approved machinery. In addition to office desks this house manufacture library tables, book cases, cylinder desks, etc. All lumber used in the factory is thoroughly seasoned, and the goods produced are of the best workmanship. Twenty-five hands are employed, with a weekly pay roll of \$425. The annual productions are valued at \$55,000. The goods are mainly sold to dealers in New York and near-by markets.

McDERMIT & LOOKER, 843 and 845 Broad-street. The manufacture of furniture was begun in Newark by Mr. Peter G. McDermit, the senior member of the above firm, in 1836. Sixteen years ago the present firm was organized by the admission to the business of Mr. A. T. Looker, who had previously for several years been in the employ of Mr. McDermit. In the earlier history of this firm's business a large trade was done with the Southern cities from Richmond to New Orleans. Since the war this trade has gradually decreased, though with the improvement of affairs in that direction it will doubtless resume its accustomed activity and importance. The business of the firm, while it has fallen off in one direction, has greatly increased in others, and so much so that the amount of production and annual sales are now greater than in previous years. Their trade with the South, however, is even now of considerable importance.

The productions of the manufactory comprise parlor and bedroom furniture of all descriptions, finished in walnut, mahogany or rosewood, and the goods are sold both to consumers and dealers. Chairs and parlor furniture are sold at wholesale to the Southern trade, though the firm's business is mainly confined to Newark, other towns in New Jersey, and New York city. The finest grades of furniture are made by the firm, and this together with their extended business connections form an important part of Newark's industrial and commercial supremacy. Forty hands are employed in the factory, and the weekly pay roll

is \$550, the value of annual production being \$75,000, though this result does not include the whole amount of yearly sales, which are much greater.

JOHN RUCKELSHAUS, 845 Broad-street. The productions of this manufactory are a general line of upholstery work, comprising, parlor suits, tetea-tetes, chairs, sofas, lounges, etc. Mr. Ruckelshaus began this branch of the furniture business in 1864, and at present employs 18 hands, the summary of weekly wages being \$250. Sales are made to the trade, and the value of annual productions is \$50,000.

SMITH & HEDGES, Passaic Avenue. This furniture manufactory was established in 1865 under the firm name of Smith & McClave. The present firm was formed in 1868, and its members are Messrs. Wm. M. Smith and Joseph Hedges, the senior partner, Mr. Smith, having been identified with the business from its inception. The products of the factory are a general line of furniture, and sales are made exclusively to the trade. The principal markets for the goods are New York city and other towns in New Jersey. Twenty-five hands are employed by the firm and the weekly pay roll amounts to \$300, the annual production being \$100,000.

DAVID WALKER, 8 Commercial-street. A special line of furniture is made at this factory, consisting of self-rocking, hand-swing and the common varieties of cradles; also, folding and set-up crib bedsteads. The business was established by Mr. Walker in 1853. The goods made by him are of the finest quality, and they are sold to the trade in all parts of the United States. Twenty-five hands are employed, and the weekly pay roll is \$350. The value of the yearly product is \$36,000.

WOOD HAME MANUFACTORIES.

C. H. JACOBUS, 22 Lawrence-street. The products of this factory are wood hames and saddle trees. The business was established 28 years ago. The productions are mainly sold in the home market, though some goods are shipped to California. Three hands are employed the weekly wages being \$30. The annual production of these articles is valued at \$5,000.

WM. HEYDECKE, 83 Mechanic-street. The products of this manufactory are wood hames, and the business was established during the present year. Four hands are employed, and the weekly pay roll is \$35. The value of yearly product could not be determined.

PACKING BOX MANUFACTORIES.

JACOB GAUCH & BROTHER, East Mechanic and Bruen streets. The production of packing boxes for manufacturers and the trade is now quite an important branch of industry. The box factory known under the above style was established in 1858. It is perhaps the oldest manufactory of its kind in Newark, and probably the largest. These boxes are shipped extensively to various parts of the country. In addition to wood boxes, plain and fancy paper boxes of every description are made. Seventy hands are employed, and the weekly pay roll is \$500, the value of annual production being \$100,000.

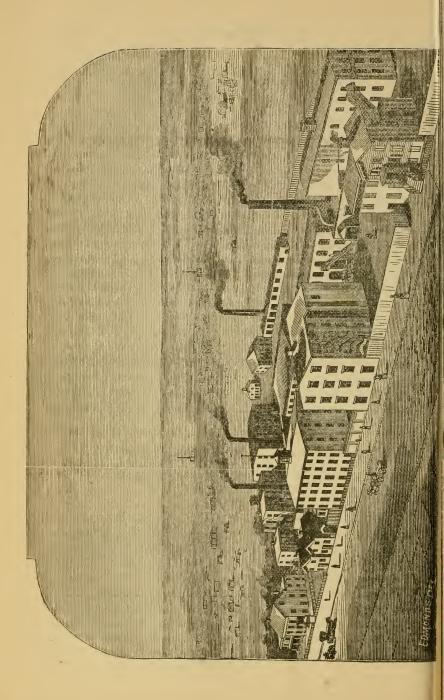
WHITTEMORE & TOLEN, 117 and 119 N. J. Railroad Avenue. The box factory known under the above style was established in 1870, and the members of the present firm are Messrs. Wm. A. Whittemore and Harry S. Tolen. All kinds of wood packing boxes are made by this firm, including trunk boxes and hat cases. The goods are sold mainly in Newark and near-by markets. The working force of the factory numbers 25 hands, and the weekly pay roll is \$400. The value of annual products is \$50,000.

J. B. MARQUET & SON, 42 Warren-street. This manufactory was established in 1853. The productions consist of packing boxes and hat cases, which are mainly sold in the home market and New York. A variety of plain and fancy paper hat boxes is also made by the firm. Fifteen hands are employed and weekly wages are paid to the amount of \$180. The total value of product is \$40,000 per year.

FANCY BOX MANUFACTORIES.

JACOB HEY, 42 Warren-street. This factory was established in 1869, and its products comprise graphoscopes, medicine chests, test tube stands; also, pistol, gun and knife cases, and all kinds of fancy boxes. These goods are mainly sold in New York city. Five hands are employed, and the weekly pay roll is \$50. The value of yearly production is \$5,000.

T. LEIBE, 7 N. J. Railroad Avenue. The products of this factory consist of malogany fancy boxes, including medicine chests, pistol cases, surgical instrument cases, &c. The business has been established 22 years. Four hands are employed, and the weekly wages are \$35. The goods produced yearly are valued at \$5,000, and they are mainly sold in New York.



MANUFACTURES IN WOOD.—SUMMARY.

| Manu | factures in and wood of every kind | 31 |
|-------|------------------------------------|--------------|
| Total | number Employees | 1,107 |
| 44 | amount of wages paid weekly | \$15,745 00 |
| 44 | " wages paid per year | 808,740 00 |
| 46 | value of annual production | 2,459,000 00 |

Comprising:

| | | | | No. of em- ployees | Weekly Wages. | Annual Production. | |
|---------------------------------------|-----------------|--|---|--------------------------|------------------|-----------------------|--|
| Wheel and Carriage Wood Work Manuf's. | | | 8 | 150 | \$2,280 | \$411,000 | |
| Wood Faucet | Manufactories . | | 1 | 25 | 400 | 40,000 | |
| Furniture | ££ | | 8 | 243 | 3,175 | 496,000 | |
| Packing Box | " | | 3 | 110 | 1,080 | 190,000 | |
| Fancy Box | " | | 2 | 9 | 85 | 10,000 | |
| Step-Ladder | " | | 1 | 3 | 50 | 12,000 | |
| Sash, Blind an | d Door " | | 6 | 560 | 8,610 | 1,295,000 | |
| Wood Hame | " | | 2 | 7 | 65 | 5,000 | |

MISCELLANEOUS

MANUFACTURES.

VARNISH MANUFACTORIES.

The use of varnish as a means of both preserving and beautifying polished surfaces is of very ancient origin. Its manufacture was doubtless suggested by the smooth and beautifully transparent surfaces of many natural objects. The savage, delighted with the beauty of a smooth reed, attempted with greater or less success to give his wooden tools and weapons a similar appearance. The first efforts were doubtless suggested by the qualities of many natural gums as they exuded from trees.

From the earliest historic times the use of varnish has been known among the nations of the East. In China and Japan, the art was in early times fairly brought to perfection, as is clearly shown by the present use of the term "japan." The Egyptians understood it, and the pictures of Herculaneum and Pompeii have kept the bright freshness of their colors in consequence of having been covered with a kind of wax-varnish. In modern times the greater use of furniture and decoration in general has largely increased the consumption of varnish.

Varnishes are generally made by a solution of resmous substances with some liquid which will evaporate in the open air, thus leaving the transparent resinous matter deposited in a transparent film or coating on the surface to which the varnish is applied. The resins are vegetable substances which exude from trees, and they are composed of oxygen, hydrogen and carbon, resulting, doubtless, from the oxygenation of the essential oils. The chief resins used in the manufacture of varnish are copal, amber, mastic, sandarách, elemi, lac, dammar, benzoin, animè and caoutchouc. In addition, gamboge, dragon's blood, aloes and saffron are often used as coloring matter. The copal comes, from Mexico, India and Africa. The trees yielding it are the Rhus copallinum, of Mexico, and the Eiœcarpus copalifer, of India. In India a fossil variety of copal is gathered by the natives from the sands on the coast. Amber is a fossilized gum, which was furnished by the trees of some former geological epoch. On the Prussian coast near the Baltic, beds of it are found, and the labor of gathering it from the sea shore gives employment to a great number of people.

Mastic is furnished by a shrub growing upon the upper shores of the Mediterranean, and the chief supply comes from the island of Chios. Lac is a resin which exudes from the twigs and branches of various East Indian trees, when bitten by an insect called the *coccus lacca*, which swarms upon such trees as give forth a milky juice. Elemi is a gum furnished by a great variety of trees in various parts of the world. Burgoin is a fragrant resin from a peculiar tree which grows in Borneo. The other varieties of gum mentioned are brought from various countries, and mainly from the East.

The allotted space does not permit of a detailed description of the several methods of varnish manufacture and the many kinds produced. The former are almost as numerous as the number of manufacturers in the varnish trade, each firm having its peculiar receipts and formulas. The different varieties of varnish and their peculiar points of excellence are, of course, the results of almost endless combinations of the gums named. Different classes may be known, as other, spirit, volatile oil and fixed oil varnishes. The first named are very little used, owing to the rapid evaporation of the other. Spirit varnishes are generally made with alcohol, and the article generally combined with the resins in the manufacture of volatile oil varnishes is the oil of turpentine, the chief varnish in which it is an ingredient, being copal varnishes. Linseed oil is the ingredient employed in the manufacture of fixed oil varnishes.

In scarcely any branch of industry does the quality of production depend so much on the experience and skill of the manufacturer as in the varnish trade. Even so delicate a mechanism as a watch is now made almost entirely by machinery, but the varnish maker is obliged to depend on various formulas which he has discovered by careful experiments, and to insure success and preserve uniformity in quality it is necessary that these various processes should be strictly adhered to. To do this few automatic appliances are possible, and the least variation in combining the several ingredients produces a defective varnish and a consequent loss of material.

About 1836 the manufacture of varnish was begun in this country, and the first efforts of importance were made in Newark, which has ever since fully retained the supremacy in this branch of industry, both as regards the high quality of varnish and the amount of production. It is doubtful if anything can be said which will add to the reputation of Newark Varnishes, as their superior qualities are everywhere acknowledged. These results have been reached by years of constant endeavor in perfecting the processes of manufacture. Throughout the whole country the Newark varnish manufacturers are regarded as the first of their class. Mainly through their efforts has this branch of American industry been brought to such perfection that the importation of varnish, whence the main supply was formally received, has now almost entirely ceased. The only article of the kind now imported is a special variety of fine coach varnishes. And in this direction the excellence of Newark varnish is such that

the demand for the English article may be regarded as a lingering trace of the prejudice against "home productions," as the coach varnishes of all varieties made by Newark manufacturers are equal to any in the world. Their high quality is only another illustration of the general excellence of Newark manufactures. The varieties of varnish made in Newark are mentioned in the articles referring to each manufactory.

MOSES BIGELOW & CO., 356 and 358 Mulberry-street. manufactory now conducted under the above style was established in 1845 by the firm of Price, Johnson & Co., which was soon after changed to Bigelow & Price, and was thus continued until 1856, when the business passed under the entire control of Mr. Moses Bigelow who had been the master spirit and financial support of the enterprise from its early history. Few men were so intimately associated with the development of Newark as a great industrial centre than Mr. Bigelow, and he was especially instrumental in perfecting the manufacture of American varnish, the extended reputation of Newark varnishes being in great part the result of his personal efforts. At the time he began the business, successful competition with the English varnish makers was far more difficult than now, and it was only possible through intimate knowl-· edge of methods and processes, and great business energy. These Mr. Bigelow had, and the result was such that in due time he had the largest varnish factory in Newark. Soon after 1856 the son, Moses Bigelow, Jr., became an associate in the business, which was thus continued until the death of the senior Mr. Bigelow, in January, 1874, when the present firm was formed, its members being Moses Bigelow and John C. Kirtland, the firm name being Moses Bigelow & Co. Under their direction the elements of continued success in the manufacture of fine varnishes—a business wherein practical skill and knowledge go for so much—are not wanting, the senior partner, Mr. Bigelow, having had long and valuable experience as a member of the old firm. They manufacture all varieties of coach and furniture varnishes, japans, etc., and the long experience and high standing of the firm are a sufficient guarantee for the quality and excellence of their productions. Their varnishes are sold to dealers in paints, oils, etc., railway companies, and carriage and furniture manufacturers in all parts of the United States; the amount of annual sales being nearly \$200,000.

FITZ-GERALD & CO., 365 and 367 Mulberry-street. This house is the successor of the well known firm of D. Price & Fitz-Gerald, varnish manufacturers. The senior member of the present firm, Mr. John D. Fitz-Gerald, was for years connected with the old firm, and through valuable experience he is enabled to manufacture the best grades of copal varnishes, the firm's coach and furniture varnishes being favorably known to the trade. The annual productions of this manufactory are valued at \$40,000.

McWhorter-street. The manufactory known under the above style was established in 1845 by the firm of David Price & Co. Messrs. Hewson Bros. & Co., their successors, continue the business with improved facilities and methods of manufacture. They are well known for a strict adherence to the production of first-class goods only, their fine grades of railway, coach and furniture varnishes being everywhere acknowledged as superior in durability, brilliancy and free working qualities. The various grades of coach varnishes are made from carefully selected materials, and by perfected processes under the personal supervision of members of the firm. A fine quality of drying japan is also made, and this firm are the sole manufacturers of Crockett's (ox brand) enamel top finish for re-finishing coach and carriage tops, and all kinds of black enameled leather and cloth.

Messrs. Hewson Brothers & Co., in addition to their lines of varnishes, have done much to perfect the manufacture of black baking japans, or enamels. The manufacture of these goods is now an important branch of industry, as they are largely used for finishing purposes by manufacturers of grates, fenders, hardware, etc. This class of goods was until recently largely imported, but, in great part by the efforts of this firm, importations have nearly ceased. Their first quality of baking japan for grate frames and fenders is a remarkably tough and elastic enamel, having a very brilliant and rich lustre, with unsurpassed flowing and covering qualities, and will not tarnish in any atmosphere. It is in use by most of the leading grate and fender manufactories in the United States. Their other grades of baking japans for saddlery and general hardware, sewing machines and locks, also a brown japan for tinners' use, are admirably adapted for the purposes named. The firm make a specialty of adapting japans to all kinds of work, whether steam or fire heat is used, and they thus cater to the wants of the trade. In perfecting the purity and brilliancy of these goods, Messrs. Hewson Bros. & Co. have done much to assist the operations of manufacturers in other lines of industry. The value of the firm's annual productions is \$90,000, and sales are made both to dealers and consumers in all parts of the country.

A. E. HOPPOCK & CO., 369 to 375 Mulberry-street. This manufactory was long known to the trade under the style of S. P. Smith, who was a pioneer in the varnish industry of the country, having begun the business in Newark during 1836. He did much to bring about the merited reputation of Newark varnishes, and the present firm, who succeeded to the business during the present year, are quite capable of carrying on the work so well begun. The members of the firm are Messrs. A. E. Hoppock and Ansel H. Phinney. They continue to manufacture the standard line of goods so long and favorably known to the trade, a specialty being fine carriage varnishes. The annual productions

are valued at \$70,000. Sales are made in the Eastern, Middle and Western States.

ANDREW HILL & CO., 20 and 22 Vesey-street. This firm are the successors of W. H. Bannister & Co., and the business was established in 1856. Fine railway and coach varnishes are manufactured by the firm, and sales are mostly made to consumers. The value of annual productions is \$10,000.

HEDDEN & WHEELER, 317 and 319 N. J. Railroad Avenue. This varnish manufactory was established in 1859 by Mr. E. B. Hedden. The present firm was organized in 1873 and its members are Messrs. E. B. Hedden and F. D. and O. H. Wheeler. The firm has an established reputation throughout the country for producing the finer qualities of coach and furniture varnishes together with drying japans. The factory is on the line of the Pennsylvania Railroad, thus giving convenient shipping facilities. The markets are mainly in New York State, and sales are made principally to carriage makers and other manufacturers. The amount of annual productions is placed in the general summary.

THE LONDON MANUFACTURING COMPANY, 113 Chestnut-street; Office, 246 Grand-street, New York. This varnish factory has been recently established in Newark. The managers of the Company are skilful manufacturers and energetic men, and they already have a prosperous and growing trade. A general line of superior copal varnishes is made, together with fine qualities of dazzle black baking japans, an article known as Brunswick black varnish, etc. It is claimed for the dazzle black japans that they have a uniform quality and are adapted to all purposes that such varnishes are used for. The business of the Company being but partially developed the value of yearly production could not be definitely ascertained.

MURPHY & COMPANY, 238 MeWhorter-street. The house of Murphy & Company, varuish makers, was established in 1865, and the members of the present firm are William H. and Franklin Murphy and James G. Barnet. They are a representative firm, and although beginning the business when varnish making in this country was well developed a great deal has been done by them toward bringing to a higher state of perfection the manufacture of American varnishes. Perhaps in no single branch of industry does the reputation and character of a firm go for so much as in the varnish trade. In the finer grades of varnish many qualities are requisite, and to secure these the consumer must rely on the integrity of the manufacturer, as their existence can only be discovered by actual wear. Messrs. Murphy & Co., through a strict adherence to improved manufacturing processes, the selection of only the best material and a careful attention to the wants of the trade, are now one of the leading varnish houses in the country.

At their Newark factory are made the best grades of coach varnishes, and

no firm has been more efficient in perfecting the quality of the American wearing body varnish, the products of their factory being fully equal to the English article. Their efforts are constantly in the direction of uniform qualities and a higher standard. Furniture and other varnishes are also made, together with drying japans.

As an outgrowth of the firm's extended business, a branch house has been established in Cleveland, Ohio, and the business there is conducted under the style of Murphy, Sherwin & Co. The works in that city are now larger than the Newark factory, the productions at that point being specially adapted to the Western trade. Sales are made in all parts of the country. Both at Cleveland and in this city the full capacity of the works are employed, and Messrs. Murphy & Co. have a constantly growing and prosperous business. The annual productions of the Newark factory are valued at \$185,000.

OSBORNE, LEWIS & CO., Chestnut and McWhorter streets. This manufactory was established in 1872, under the style of the Osborne Manufacturing Company, which was continued until January of the present year, when the present firm name was adopted. Although recently started the firm has already won an excellent reputation as varnish makers. Mr. Isaac Osborne, of the firm, who previously had an extended and valuable experience, gives his personal supervision to the manufacturing department. Special attention is given to the manufacture of coach varnishes, the grades of wearing and medium drying body varnishes being regarded as unsurpassed by any in the market. In the varieties of coach varnishes their stock is fairly complete, comprising the several varieties of body varnishes for coach and carriage manufacturers; also, a superior quality of drying japans. Messrs. Osborne, Lewis & Co., have an increasing trade, and are rapidly becoming one of the leading houses of New ark in the manufacture of varnish. Their productions for 1873 were valued at \$100,000. Sales are principally made in the Eastern and Western markets.

PRICE, BOND & CO., 255 and 257 N. J. Railroad Avenue. This firm was established in 1856, and is therefore one of the oldest in the business. They manufacture fine railway, coach and furniture varnishes, and also drying and baking japans. Their principal productions, however, are the varieties of varnishes named. Four manufacturers are employed, and sales are made principally in the Eastern markets, though goods are shipped to all parts of the country. Messrs. Price, Bond & Co. have an excellent reputation, and their goods are everywhere acknowledged to be as represented, which is an important requisite in this business, as the quality of varnish is known by the character of the manufacturer. The value of the firm's annual productions is \$75,000.

JOHN J. REID, 354 Mulberry-street. Mr. Reid began the production of fine varnishes in 1849, and he is now one of the oldest manufacturers in the trade. A fine grade of railway and coach finishing varnishes is made at this factory, the purpose of the proprietor being to manufacture only the better qualities. Sales are made to consumers in New York and other Eastern cities, though some goods are sold in the West and other parts of the country. The yearly product of this factory is valued at \$25,000.

E. C. ROBERTSON, 124 to 128 Chestnut-street. This varnish factory is one of the oldest in Newark, having been established nearly 30 years ago under the firm name of Pierson & Robertson, and the latter gentleman has been sole proprietor during the last fifteen years. Mr. Robertson's productions comprise fine qualities of coach, railway and furniture varnishes, together with a grade of goods specially adapted to the finishing of patent leather, enameled cloth and oiled silk. In this direction he excels, and the varnishes of this class are largely used by manufacturers of the goods named. The coach, railway and furniture varnishes are sold throughout the country, and the other varieties mentioned mainly find a market in Newark. The yearly productions of the factory are valued at \$30,000.

CHARLES H. SHIPMAN & BROTHER, 352 Mulberry-street. The varnish manufactory conducted under the above style is one of the oldest in Newark and was previously known to the trade under the firm name of C. T. Shipman & Son. The firm has an acknowledged reputation for integrity in business and the excellence of their productions. They make a specialty of the finer grades of railway car varnishes, and the brands of extra car finishing and rubbing, locomotive finishing and rubbing, inside or furniture, white damar, together with drying and black japans, and pure shellac, are scarcely excelled in their line. The firm employs four men in the manufacturing department. Sales are made generally throughout the United States, and largely to many of the principal railroads of the country. The annual production of the manufactory is valued at \$75,000.

J. STEFFENS, 84 to 90 Vesey-street. The varnish manufactory now conducted by Mr. Steffens was established in 1862 under the style of Steffens, Stern & Co., soon after, however, Mr. Steffens became sole proprietor. He now manufactures a general line of coach and railway varnishes together with a superior quality of baking japans, the last named goods being his well known specialty. Sales are principally made in the Eastern markets. The value of annual productions is \$50,000.

NEWARK INDUSTRIAL EXHIBITION BUILDINGS, WASHINGTON, COURT & MARSHALL STREETS.

CLOTHING MANUFACTORIES.

The manufacture of what is known as ready-made clothing as a separate branch of industry in this country, has mainly been the growth of the last forty years. The business was at first carried on in a desultory way, and the great wholesale manufacturing establishments of to-day have been the growth of comparatively a few years. While the clothing industry of Newark is less than many other of the city's interests, there are a few houses which carry on an extensive business, and do much toward supplying the Southern, and a part of the Western markets with medium and fine grades of goods.

Few branches of industry in Newark give employment to more hands than the clothing trade. The work, however, as carried on, is largely done for outside manufactories, and these are chiefly New York houses. Many large Newark factories, employing from 25 to 50 hands, are kept constantly working for New York clothing houses. This is an important feature of Newark's industries, and while the work done is immense, it is of such a nature that the gleaning of accurate statistics concerning it is impossible. It is probable, however, that there are employed in the city's various clothing factories, outside of those included in the following pages, nearly 2,000 hands, mostly women and girls, and hundreds of sewing machines. These facts still further show what an immense workshop the city of Newark has become. Only those clothing manufacturers properly classed as wholesale are mentioned below.

GARTHWAITE, LEWIS & MILLER, 199 and 201 Market-street. This well known wholesale clothing house was established in Newark a quarter of a century ago under the style of I. Meeker & Co. The present firm was organized in 1870, and its members are Messrs. Caleb C. Garthwaite, William M. Lewis, and James A. Miller. Medium and the very finest grades of clothing are manufactured by this firm. The business done is the largest of its class in New Jersey, and the amount of annual sales reaches half a million dollars. The work of about 400 hands and hundreds of sewing machine is required in carrying on the business, though these statistics cannot be accurately determined owing to the method of employing minor factories. Messrs. Garthwaite, Lewis & Miller have branch houses in New York and New Orleans, the market for their goods being wholly in the Southern States.

GARTHWAITE, DARCY & WHEELER, 159 and 161 Market-street. This clothing manufactory is one of the oldest in the country, having been established in Newark during 1830, under the style of C. Alling & Co. The present firm was organized about 18 years ago, and its members are Jeremiah C. Garth-

waite, Henry G. Darcy, and William G. Wheeler. The productions are confined to the finer grades of goods, and they are sold entirely in the Southern markets. The firm has a branch house in New Orleans under the style of Darcy & Wheeler. The work of about 150 hands is required to carry on the firm's business, and the yearly manufacture of goods is valued at \$150,000, this, however, being exclusive of the whole amount of sales, which is much larger.

J. C. LUDLOW, 828 Broad-street. The clothing manufactory known under the above style was established in 1863. Mr. Ludlow manufactures medium and fine grades of goods, and the markets are mainly in the South Atlantic States, through a branch house in Savannah, Ga., under the style of Heidt, Jaudon & Co. The annual production of clothing at the Newark concern is valued at \$100,000, though in some years when trade is more active, the amount reaches \$160,000. The hands employed cannot be definitely ascertained, as the clothing is entirely made by "piece work" in the various factories to which allusion has already been made. The amount paid yearly for labor by the house is about \$22,000.

The proprietor of this manufactory, Mr. J. C. Ludlow, is a prominent citizen of Newark, having occupied several official positions of trust and honor. He is active in promoting the municipal prosperity of the city wherein his interests are located.

W. A. PERRY, 850 and 852 Broad-street. This clothing manufactory was established in 1870, and the productions comprise the finest grades of goods. Sales are made to the trade in the Western and Southern markets, and the yearly product is valued at \$150,000.

HOSIERY MANUFACTORY.

The manufactory of knit woolen and cotton undergarments is a prominent American industry. Gradually but surely the methods and processes of manufacture have been so improved that importations of this class of goods have almost entirely ceased, the only exception being that in some instances special grades of undergarments are brought from England, and these more for the purpose of supplying what may be termed a fictitious demand than because of any real necessity not fully supplied by home manufacturers.

So far as the manufacture of fine undergarments is concerned, successful com-

petition with the foreign producers has been reached under exceptionally adverse circumstances. The wool used in the production of these goods is necessarily of the finest kind, and is known in the market as South American and Australian wools. They constitute the raw material for the manufacture of the finer grades of American hosiery. By means of the tariff referred to the cost of this raw material is greatly increased, and it is only by extraordinary energy and superior skill that the manufacturers of these goods are enabled to make the finest grades in the face of foreign competition. It is obviously true that without the tariff, and raw material free, the United States would soon have an exporting trade in these goods.

These facts serve to illustrate the difficulty, not to say impossibility, of so framing a protective tariff as to meet all conditions of a nation's industry. No tariff, however nicely adjusted, will ever enable American farmers to grow the fine wools of South America and Australia. Peculiarities of soil and climate cannot be overcome by artificial and extraneous devices. No protective tariff can transfer to this country the wonderful results of the warm life-giving sunshine which falls on the vine-clad hills of southern France. The welfare of all is best promoted by a free interchange of those natural products to particular countries or climes, and which constitute the raw materials requisite for various manufacturing processes. Under as favorable conditions and equal chances American skill needs no artificial stimulus to assure its complete triumph.

THE PETERS MANUFACTURING COMPANY, Cherry and Canal streets. Although Newark has but one manufactory engaged in the production of knit woolen and cotton undergarments, this alone is sufficient to give it great prominence in this regard. The hosiery factory now known under the above style was established in 1854, and after successive changes it passed under the proprietorship of the Peters Manufacturing Company, which was organized under the laws of New Jersey, in 1872, and of which Mr. H. N. Peters is the principal stock holder, and also Treasurer and business manager. This establishment is now one of the largest of its kind in the country. During the years of its development Mr. H. N. Peters has been the master spirit of the enterprise, and to his energy and earnest efforts this branch of American industry is greatly indebted.

The operations of the factory are confined exclusively to the finer qualities of hosiery for men's, women's, and children's wear. The line of goods made have peculiar points of excellence, and they are on this account different from those made by other manufacturers. The material used is the finest South American and Australian wools. In directing the Company's business, Mr. Peters has availed himself of all improvements in machinery and methods of manufacture whether of American or British origin. Chiefly through his efforts the prosperity of the Company has so increased, and the high character and reputation of their goods has become so great that during the late financial de-

pression, from whose ill effects the country is only now recovering, the operations of the factory were not curtailed in the least, and instead of lessening the rate of production, a constant increase has been the result.

In addition to the production of hosicry, an extensive business is done in making an extra quality of heavy sheeting for use in the manufacture of oil-cloths. It is produced in various sizes and is sometimes made fifty and sixty inches wide. The quality of these goods is very superior, and they are mainly sold to oil-cloth manufacturers in Newark and elsewhere.

The number of hands employed in the Company's knitting mill is 400, including those engaged in making the qualities of sheeting mentioned. The summary of weekly wages is \$2,500, and the value of yearly production is \$550,000, inclusive of the heavy sheeting made, which is valued at \$150,000. Sales of the hosiery goods are principally made to commission merchants in New York and Philadelphia, and by them distributed to all parts of the country.

SHIRT AND COLLAR MANUFACTORIES.

As a separate branch of industry the manufacture of shirts has during recent years grown to great prominence. These results have been in great part due to the introduction of the sewing machine as a means of facilitating and cheapening production. Another important feature, however, has been a greater demand for this class of goods, owing to increased wants of modern society, as a consequence of the industrial developments in all directions. The "Song of the Shirt" has given way to the ceaseless hum of the sewing machine. While in previous years shirt making was mainly a domestic industry, it is now almost entirely carried on in large factories, and the products are sold to the trade and thence distributed to consumers. By this method the cost of production is greatly decreased, and the industry will doubtless annually increase.

As regards the amount of business done in shirt manufacturing, Newark is now one of the principal cities in the country, and in relation to the high quality of goods produced it is unsurpassed. This city has become a chief source of supply for all the first grades of shirts, cuffs and collars, and the efforts of her manufacturers in this line have been important contributions to the development of shirt making as a distinct branch of American industry.

JOHNSTON & SUTPHEN, 847 and 849 Broad-street; Salesroom, 594 Broadway, New York. Among those who have contributed most to the growth of shirt manufacturing in Newark, is the firm named above. The business was established in 1851, and the senior proprietor, Mr. Robert Johnston, has been associated with the enterprise from its inception. The present firm was organized in 1865, when Mr. C. Edgar Sutphen became associated with Mr. Johnston in the business, and since then the style has remained unchanged. Mr. Johnston's early efforts, and afterwards those of the present firm, have done much to improve the standard of taste in the manufacture of fine dress shirts. The new style of shirts are to a great extent introduced by this firm. Their productions are confined to the finer grades of shirts, and only the best materials and methods are employed. Unlike most other houses, this firm keeps in stock a large supply of shirts of their own manufacture, and at their salesrooms in New York over 65 different styles of shirts are kept in stock, thus giving the trade a wide range in selection. The firm's productions are well known throughout the country by their trade-mark, the "Broad Arrow."

The hands at present employed in the factory number 150, and the weekly wages paid amount to \$1,000. This, however, only partially represents the labor and wages necessary for carrying on the firm's business, as a great deal of work is done outside of the factory. The annual production of shirts by this firm is valued at \$300,000. Sales are made to the trade in all parts of the country.

J. H. KIRKPATRICK, 151 Market-street. This manufactory has been in operation since 1856. The productions consist of fine dress shirts. Mr. Kirkpatrick has by industry and thorough work built up an established reputation. The productions of his factory are sold to the trade in the Southern and Western markets. Only first class goods are made, and special orders receive careful attention. Twenty-five sewing machines are required and 30 hands are employed in the factory proper, the weekly wages being \$300. In connection with the factory is a well appointed laundry, and thus all the facilities of production are comprised in one establishment. The yearly manufacture of shirts is valued at \$80,000.

MARLEY, COOK & CO., 223 Market-street; Salesroom. 676 Broadway, New York. This manufactory was established in 1867 by Messrs. James H. Marley and William H. Cook under the style of Marley & Cook. The business was thus continued until recently, when Mr. E. S. Eunson of New York, was admitted as a partner, and the present firm name adopted.

Few firms have risen so quickly into prominence as this, as they are now among the first houses in their line, and their establishment is one of the best appointed shirt manufactories in the country, and is perhaps the largest of its kind in Newark. The members of the firm are all young men,

and through energy and careful attention to the wants of the trade, they have achieved that success which is the inevitable result of earnest and well directed efforts.

Their establishment on Market-street is large and conveniently arranged, with facilities for the application of steam power. In connection with the factory is a well appointed steam laundry, provided with improved machinery necessary for thorough and rapid work. In the factory proper 75 sewing machines are now in operation, and owing to the increasing business the number will be increased to 100 during the coming spring. By selecting first class material and the use of the best methods of manufacture, this firm has won the excellent reputation which is everywhere awarded to their productions. Their popular shirt, the "Acme," is favorably known both by the trade and consumers throughout the country. The goods are mainly sold to dealers, and careful attention is given to special orders, either from individuals or the wholesale trade. The hands employed in the main factory number 125, though much additional labor is employed outside. The amount of wages paid weekly is \$1,600, and the value of annual productions is \$300,000. These figures show that shirt manufacturing is of no slight importance in the summary of Newark's industries.

F. H. SMITH, JR., 715 and 719 Broad-street; Salesroom, 634 Broadway, New York. Mr. F. H. Smith, Jr., became sole proprietor of this manufactory in 1857, succeeding the firm of Waldron & Speer. In the following year a removal was made to the commodious factory at the above location. During the intervening years the business has rapidly grown, and the elements of success have been the energy of the proprietor and the increased wants of the country. The productions of this manufactory consist of shirts, collars, and gentlemen's neckwear. Mr. Smith confines his attention to goods of the finest grade, and the quality of his productions is unexcelled. To adhere to so high a standard requires the utmost care and attention, and Mr. Smith's reputation throughout the country, for first class work only, is generally acknowledged, even by his competitors. A special feature of his productions is the Improved Pattern Shoulderseam Shirt, which for perfect fit is unsurpassed, and his styles of collars and neckwear are well and favorably known to the trade.

In the rear of the extensive factory a large building has been erected for laundry purposes. Sixty machines and 100 hands are required in the factory proper, and the weekly pay roll is \$900. Additional outside labor is employed, which would largely increase the figures given. The value of annual production is \$250,000, and the goods are sold in all parts of the United States.

WHEELER & ALLING. Futile efforts were made to secure the statistics of this manufactory. All particulars were refused, on the ground that "it was not in accordance with the firm's business principles to afford the public any information concerning the nature and extent of their business."

BUTTON MANUFACTORIES.

During ancient times buttons were not so universally used as now. The first suggestion of a button was doubtless the use of a thorn or sinew by which the savage pinned his robe together. It may not be too much to say that the Romans retained the use of the toga chiefly because they had discovered no inexpensive way of making buttons. At the present time the quantity of buttons consumed is enormous. 'The facts are not at hand for an estimate of the world's production in this direction, but, could its value be definitely ascertained, the result would be surprising. Newark is one of the principal cities of the country in the manufacture of all varieties of buttons, and as will be seen below, this city has the largest button works in the United States.

NEW JERSEY MANUFACTURING COMPANY, 266 to 276 N. J. Rail road Avenue. This manufactory was established in 1863, under the style of the Goddard & Bro. Mfg. Co., and the business was thus continued until 1873, when the New Jersey Manufacturing Company was incorporated by special act of the State Legislature, the Secretary and Manager being Mr. Charles Radcliffe, who had previously been identified with the enterprise from its inception. The growth of this manufactory to its present prominence as the largest button factory in the country, has been mainly due to the great energy and executive ability of Mr. Radcliffe. Other factories may excel in special kinds of buttons, but in the high quality, great variety and amount of yearly production the New Jersey Company is without a successful rival. This result has been reached only through persistent labor and business foresight of the first order. The productions comprise buttons, hooks and eyes, and metal and glass fancy articles. Buttons, however, are the principal products, and all varieties are made, including the best cloth buttons. A fine line of mohair buttons for gents' wear is also made, which are acknowledged by the trade to have no superior.

Goods are sold direct from the factory, and all departments of the business have the personal supervision of Mr. Radcliffe. To show the rapid growth of the business it is only necessary to state that during 1873, notwithstanding the financial depression, the productions of the factory were greater than for any previous year. The working force of the factory numbers 150 hands, and the weekly pay roll amounts to \$1,000. The value of annual productions is \$200,000, and the goods are sold exclusively to jobbers in all the principal cities of the United States.

THOMAS DAVIS, Sheffield and Nassau streets, (Bishop's Factory.) The products of this manufactory are pearl buttons and studs, and a general line of

pearl work, Thirty hands are employed, and the summary of weekly wages is \$275. The yearly product of buttons is valued at \$30,000, and the goods are sold generally throughout the country.

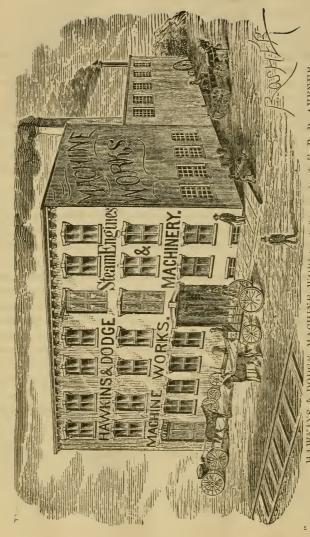
WM. GREAVES, 9 Alling-street. This manufactory was established in 1873, and the productions comprise a general line of pearl goods, such as ladies dress buttons, &c. Three hands are employed, and the weekly wages are \$25. The value of yearly product is \$5.000, and the goods are sold to New York jobbers.

JOHN E. McGRATH, State and Sheffield streets, (Bishop's Factory.) In the manufacture of all kinds of buttons Newark has just claim to being one of the chief seats in this branch of industry. Mr. McGrath was established in 1866, and manufactures sleeve buttons, screw studs, pearl jewelry, and a full line of all kinds of pearl buttons for shirts. These goods are mainly sold in the New York market to the trade. Twenty-five hands are employed, with a weekly pay roll of \$250. The value of annual productions is \$30,000.

SMITH & WOODWARD, (Newark Pearl Button Works,) Hedenberg Works. The products of this factory are pearl buttons of all kinds, including sleeve buttons, studs, &c. Thirty hands are employed, and the weekly wages are \$250. The value of annual productions is \$40,000, and they are mainly sold to New York jobbers.

P. SMITH & CO., Hedenberg Works. The pearl and ivory button factory conducted under the above style was established in 1853, and the members of the present firm are Messrs. P. Smith, John Robertson and George Buchell. The products are a general line of fancy pearl work and everything in the way of pearl and ivory buttons. The number of hands employed is 41, and the weekly pay roll is \$500, the value of annual productions being \$40,000. Sales are made to the trade throughout the country.

F. M. HOAG, Nassau Works; Salesroom, 28 Howard-street, New York. In 1863 this manufactory was established under the same style as above, and has been in operation ever since. It is now perhaps the largest establishment in Newark engaged in the manufacture of pearl and vegetable ivory buttons. One hundred and ten hands are given constant employment, with a weekly pay roll of \$600, and the value of annual productions is \$100,000. The goods of this firm embrace every kind of pearl and ivory buttons known to the trade, and are sold throughout the country.



HAWKINS & DODGE, MACHINE WORKS, 52 TO 50 M. & E. R. R. AVENUE.

SOAP MANUFACTORY.

The exact period at which soap was first used among civilized nations is not known, nor even the nature of what in the early ages was employed as a substitute for the useful cleansing composition of to-day. The date, however, when soap making was first carried on in extensive factories, is within the memory of men now living. Previous to that time soap was purely an article of domestic manufacture, and was thus made simply because a good article of the kind was not otherwise obtainable. The manufacture of soap, particularly in America, has become of late years a leading industry, and chiefly because a methodical system of improvement has followed the old haphazard means of its production.

It is an established fact that the consumption of soap is an accurate index of a nation's progress in civilization and the arts. Were accurate statistics obtainable as to the comparative amount of soap used in different countries, their comparison would result in accurate notions concerning the advancement of each nation in culture and refinement.

MICHAEL J. LEDWITH, 48 Oliver-street. The manufactory known under the above style is the only one in Newark engaged in the production of soap for an extended market. The business was established in 1828 by Moses and Caleb W. Ward, and afterwards the style was changed to Moses Ward & Son, and the next firm name was Marcus L. Ward & Company, and the members of this firm were Messrs. Marcus L. and Jacob Ward, and M. J. Ledwith. The business was thus continued until 1867, when the firm of Ledwith & Ward was formed, and during 1870 Mr. Michael J. Ledwith, who had been associated with the business for years, became sole proprietor of the manufactory.

Mr. Ledwith manufactures a general line of family and toilet soaps, of uniform quality and acknowledged excellence; also, tallow, candles, &c. These goods are mainly sold in the home and near-by markets, though an exporting trade in tallow is carried on. The annual productions are valued at \$60,000.

ENAMELED CLOTH MANUFACTORIES.

The present high state of perfection in the manufacture of oil-cloths in all varieties has mainly resulted from the efforts of Newark manufacturers. This city has been the chief centre of this industry, and to-day about sixty per cent. of all the oil-cloths produced in the United States are made in Newark. The industry was developed mainly as an outgrowth of the inventions and discoveries of Seth Boyden, first resulting in the production of patent leather. The earliest successful attempts to manufacture superior oil-cloths on a large scale were made in Newark just previous to 1850. About that time the first piece of enameled cloth, in imitation of enameled leather, was made in this city. This article was intended to supersede the use of enameled leather for covering carriage tops, &c., and it is still used for that and similar purposes. Its peculiar enameled or granulated surface is produced by passing the cloth between two rollers, one of which is so engraved as to give the required wavy or crinkled appearance. It was first successfully manufactured by the firm of J. R. & C. P. Crockett, in 1849, though other manufacturers were nearly cotemporary with them, and were quite as efficient in perfecting the various processes of manufacture. From these early efforts the manufacture of enameled cloth has extended to other parts of this country, and also to Europe, where it is now extensively made. In addition, the superior qualities of table, floor, and stair oil-cloths now in use are mainly the result of Newark's manufacturing skill and enterprise.

Previous to the late war an extensive exporting trade was carried on in American oil-cloths, and at that time the superior skill of Newark manufacturers, and their intimate knowledge of the business, gave them so great an advantage in this business, that the English producers were unable to compete successfully even in their own markets. Unfortunately for this branch of industry adverse circumstances have since arisen. During the war the cost of production so increased that American oil-cloths could not be sold in foreign markets at a profit. Since 1865, the high tariff on linseed oil, an article which enters very largely into the manufacture of oil-cloth, has produced the same effects, and the result of these years of paper money prosperity are, that the exporting trade in oil-cloths has entirely ceased, except incidentally to the West Indies, and Germany. It is thus seen that the attempt to protect the manufacture of linseed oil, which is comparatively of trivial importance, has brought about disastrous results in the production of oil cloths, not to speak of other ill effects.

Without these causes it is undoubtedly true that the United States would to-

day be supplying the world with oil-cloths. Instead of tenderly caring for American industry, as the framers of the tariff referred to intended, the production of enameled cloths has grown to great prominence in England, notwithstanding the fact that all the ideas and suggestions as to methods of manufacture originated in this country. While these facts do not necessarily conflict with protection as a wise national policy, they conclusively show that in the adjustment of a protective tariff to all the differences and peculiarities of a nation's industries greater foresight is required than men usually possess, and also, that to compel American manufacturers to pay a heavy tax on raw material is in general a doubtful policy at the best.

Although the manufacture of oil-cloths is wholly a domestic industry, it is, notwithstanding, of great importance, as will be seen by the following articles on the several manufactories. The consumption of oil-cloth is continually increasing, as new wants are constantly arising which are best supplied with this article.

ATHA & HUGHES, 19 to 43 Sussex Avenue; Salesroom, 111 Duane-street, New York. Well illustrating this branch of Newark's industries is the enameled cloth factory known under the above style. The business was established in 1854, by Mr. Andrew Atha, in a small building on the site of the present extensive establishment. The beginning was small and at that time the production was only about 120 yards per day. The elements of the great success since reached were mainly Mr. Atha's inventive genius and practical skill. He perfected manufacturing processes in many directions, and he was the first to introduce the beautiful imitations in oil-cloth of wood and marble. The business was continued by Mr. Atha, as sole proprietor, until 1870, and during that time the business grew from its modest beginning until the manufactory was regarded as the largest of its kind in the country. During 1870 the firm of Atha, Hughes & Spanier was organized, and the business was thus continued until January of the present year, when the style was changed to Atha & Hughes. Last August Mr. Atha died, after a life of great usefulness and honor. Few men, by their personal exertions, made equal contributions to the growth and prosperity of those industries which have since given Newark a worldwide fame. The business is at present continued under the above style by his partner, Mr. George H. Hughes.

The productions of the manufactory comprise stair and table oil-cloths in all varieties, a specialty being superior styles in imitation of wood and marble. The early efforts of Mr. Atha in perfecting these styles have since enabled the firm to lead the trade in this particular. The firm also excels in the manufacture of enameled leather cloth of every description and color, and in addition, superior qualities of oiled silk for hat linings, hatters' glaze, &c., are made.

A description of this extensive manufactory and the various processes of

manufacture would prove interesting, but space does not permit. The establishment has a frontage on Sussex Avenue of 325 feet, and covers about three acres of ground. Previous to the late civil war, the products of this manufactory were largely sold in foreign countries, but at present they are mainly consumed in the United States and Canada. The goods are sold to the trade, and manufacturers in other lines of industry, from the warerooms in New York. The force at present employed in the factory numbers 130 men, and the weekly pay roll is \$1,400. The value of yearly production is \$600,000, though this is greatly exceeded in busier years, when greater industrial activity prevails.

CROCKETT LEATHER CLOTH COMPANY, Seventh and Summer Avenues. The proprietors of this manufactory doing business under the above style are the successors of the firm of J. R. & C. P. Crockett, who, in 1849, first began the manufacture of enameled oil-cloth, which is extensively used as a substitute for enameled leather in finishing carriages and general upholstery work. The officers of the above named Company are as follows; President, James L. Crockett; Treasurer, John A. Crockett.

The Messrs. Crockett were the first to introduce the manufacture of enameled cloth in England. The products of their factory as at present conducted comprise all descriptions of carriage and upholstery leather cloths; also, table covers, grained and marble goods. The superior qualities of their enameled cloths are everywhere acknowledged. As varnish is largely cousumed in the manufacture of enameled cloth, its production is carried on in the same factory. The finer qualities of coach and furniture varnishes are made, and extensively sold to consumers of varnish generally. The working force of the factory numbers 50 hands, and the weeklypay roll is \$750, the value of annual production for the present year being \$200,000. The enameled cloths are sold in all parts of the United States, and occasionally exported to the West Indies.

THE PETERS MANUFACTURING COMPANY, 579 to 587 Market-street; Warchouse, 124 and 126 Church-street, New York. This manufactory was established during the early history of oil-cloth manufacture in Newark, and was long known under the style of Peter Nenninger. A few years since the establishment passed under the entire control of the Peters Manufacturing Company, and since then this company has greatly improved the methods of manufacture, and as a result the business has largely increased. Mr. William H. Haynes is manager of the oil-cloth factory, and by his ingenuity and skill he has done much to perfect this branch of industry. This, as well as the hosicry department of the Company's business, is under the direction of the Treasurer, Mr. H. N. Peters. The Company has superior facilities for cheapening the manufacture of oil-cloth on account of making the sheeting required in their own factory, of which mention is made elsewhere. The varieties of goods made are known as enameled table and stair oil-cloths. About 3,600 yards of

cloth are produced daily. The working force of the factory numbers 125 men, and the wages paid weekly amount to \$1,400, the value of annual productions being \$400,000. These goods are sold in all parts of the United States both to jobbers and manufacturers, and they are occasionally exported to Cuba and Germany.

J. H. THOMAS, 64 James-street. This oil-cloth factory has been many years in operation. Mr. J. H. Thomas became proprietor of the establishment during the present year. The products are enameled and table oil-cloths in the various colors and styles. The goods are mainly sold to jobbers in New York City, and from there distributed to all parts of the country. The yearly production is valued at \$75,000. Twenty-five hands are employed, and the weekly pay roll is \$500.

EDMUND F. HEATH. 225 to 239 Warren-street. The proprietor of this manufactory was respectfully asked for statistics relative to the variety and extent of his productions. He uncourteously refused all information.

GLUE MANUFACTORY.

JOHN WILLIAMS & CO., Seventeenth Avenue and Lillie-street; Salesroom, 276 Pearl-street, New York. But very little is known concerning the history of glue making Formerly the artist and the artizan made for themselves what little glue they required. The semi-civilized peoples made it in a simple way by boiling pieces of skin. Fish sounds, that is, the bladders of the fish, now called isinglass or fish glue, have from time immemorial been known as a substance from which glue could be made. In modern times glue is made from the hides, skins, sinews and tendons of animals.

The glue factory at the above location was established in Newark about 26 years ago. After successive changes, the concern passed under the control of John Williams & Co. in 1866. The products of the factory comprise glue, neat's foot oil and sizing, the principal production being the first named article. The markets for these goods extend over the United States. The working force of the factory numbers 25 hands, and the weekly wages amount to \$300. The value of the annual products is \$60,000.

BRITANNIA WARE MANUFACTORIES.

MARTIN DOLL, 115 N. J. Railroad Avenue. This manufactory was established in 1865, and its productions are various articles made from britannia consisting mainly of glass trimmings, bottle tops, &c. These goods are sold in nearly all parts of the country to glass, hardware and drug stores; also, ink and mucilage manufacturers. Sixteen hands are employed in the factory, and the weekly wages are \$120. The value of annual productions is \$15,000.

FREDERICK FINTER, 83 Hamilton-street. The products of this factory comprise a line of britannia ware, mostly used for glass trimmings. The goods are sold in all parts of the country. The factory gives employment to five hands, and the weekly pay roll is \$60. The yearly product is valued at \$7,000.

PAPER BOX MANUFACTORIES.

E. B. HOTCHKISS, 878 and 880 Broad-street. The great development in the production of small articles has led to the manufacture of paper boxes on so extensive a scale, as to form of itself an important national industry. Few cities in the Union consume a greater amount of paper boxes than Newark. Happily for the prosperity of the city, the paper boxes required in Newark are wholly the product of home industry.

The largest paper box manufactory in Newark, or New Jersey, is the one conducted at the above location by Mr. Hotchkiss. Having previously had valuable experience in the business, he began the manufacture of paper boxes in Newark during 1871. His first efforts were quite modest. The working force consisted of three girls, and the goods were delivered in a basket. These facts are stated to show the very rapid growth of the business to its present wide proportions. Largely through the efforts of Mr. Hotchkiss this branch of industry in Newark has so increased that, as mentioned above, the Newark demand for these goods is fairly supplied with the products of home industry.

His factory is in a large and commodious building on Broad-street, built expressly for this purpose, and it is one of the best appointed factories of its kind to be found, the necessary steam power being furnished by a Baxter engine located on the premises. The productions comprise paper boxes of all descriptions, though the fine qualities are adhered to, as only glue work is made. The factory is provided with the best manufacturing facilities, consisting of improved machinery and various conveniences, which do much toward cheapening production.

New styles of goods are constantly being made, and Mr. Hotchkiss is prepared to make all varieties of fine boxes to order. While his trade is at present mainly onfined to the home market, it will doubtless soon extend to other cities in New Jersey and elsewhere. No reason exists why Newark should not do a large outside business in paper box manufacturing. The working force of this factory numbers 175 hands. The weekly pay roll amounts to \$600, and the value of annual production is \$75,000.

B. OSBORN, 320 and 322 Market-street. The products of this manufactory are Osborn's Patent Paper Boxes, which are manufactured solely by the patentee, Mr. Bennett Osborn. These boxes, now so well and favorably known to the trade throughout the United States, are usually made of flexible manilla paper, and from one piece. They are largely used by confectioners and those engaged in kindred lines of trade. By a later invention Mr. Osborn is enabled to make these boxes so that they will pack perfectly flat, thus avoiding bulky freight and expensive transportation. The manufacture of these improved boxes was begun by Mr. Osborn about 1868, and his trade has since grown to wide proportions, as the boxes are used in all parts of the country. He is constantly perfecting improved machinery, thereby cheapening the cost of production. Thirty hands are employed in the factory, the weekly pay roll being \$300, and the value of annual production \$50,000.

HENRY N. DOOLITTLE, 117 and 119 N. J. Railroad Avenue. This box manufactory was established in 1870. Mr. Doolittle makes all varieties of plain and fancy paper boxes, including hat and millinery boxes; also, wood hat cases. Mr. Doolittle's success well illustrates the recent rapid growth of paper box manufacturing as a distinct branch of Newark's industries. His trade is mainly in the home market, though some sales are made in neighboring cities and States. Twenty-five hands are employed in the factory, and the weekly wages amount to \$200. The value of yearly productions is \$50,000.

CHARLES MERZ & SON, 48 Mechanic-street. The box factory known as above was established in 1865. The products are paper boxes of all kinds, and they are mainly sold in Newark. Four hands are required in the factory, and the weekly wages are \$20, the value of annual product being \$4,000.

CHEMICAL WORKS.

LISTER BROTHERS (Passaic Carbon and Agricultural Chemical Works), foot of River-street; Branch Office, 159 Front-street, New York. Man's first possessions were the direct products of the soil, and the wondrous benefits of modern civilization are more fully realized, when it is considered that the complex results accruing through successive ages of progress, and which, in all their varied forms, minister to the welfare of mankind, have all sprung, however indirectly, from the same original source. Everything which in the least contributes to the support and enjoyment of humanity could be traced, through successive changes, were man's intellect equal to the task, back to the same bounteous giver—mother earth. These premises granted, it is readily seen that agriculture is the basis of national wealth and prosperity.

It is not strange that in the early stages of the world's history, the stores of wealth contained in the soil should have been considered practically inexhaustible. Population was scattered, and thorough and long continued cultivation, resulting in repeated croppings of the soil, was then unnecessary. modern times, with dense population, came increased wants, and the result has been that the soil, which was before considered an unfailing source of wealth, has in recent times, by continuous cultivation, been so depleted of the chemical agencies which sustain vegetable life, as in many localities to leave behind only sterility and barrenness. With this discovery it was realized that all vegetable growth withdraws from the soil certain chemical properties which are indispensable to its complete integrity. Every bushel of wheat or product of any kind, whether vegetable or animal, which is grown, takes from the soil some portion of its vital principle, and by continuing the process it becomes deteriorated, and in the end destroyed, so far as its productive qualities are concerned. Happily for advancing civilization these discoveries came with the development of chemistry, when it was in the power of science to analyze matter and accurately determine the various essential elements of a prolific soil. These learned, it became necessary to devise artificial means for returning to the earth its richness and fertility, and the efforts in this direction resulted in the growth of agricultural chemistry.

Being the oldest in civilization, the first attempts at scientific and systematic fertilization were made in Europe, and they occurred there about the beginning of the present century. Owing to the great extent of territory, and the tendency of farmers to emigrate in search of more fertile districts, the ill effect of constant cropping was not observed in the United States until about 1840. The

census of that year clearly showed that in many of the older States the productiveness of the soil was decreasing, and unless this tendency could be neutralized by artificial methods it was seen that the ultimate results would be disastrous. At that time the philosophy of the whole subject began to be widely considered, and since then improved modes of agriculture have been adopted, and systematic fertilization has become more general. It would seem, that man could not be so ungrateful as to withdraw from the soil its richness and fertility to gratify his desires, without earnest efforts to return to the earth by means of proper fertilizing material, the chemical equivalents of the wealth thus received, if not for himself, at least for those who are to come after. It is true, however, that the diffusion of intelligence is not yet sufficient to fully secure these results.

Various agencies have been employed to replenish the soil which has lost its productiveness. Barn yard manure, the waste of cities and guano have been factors of no small importance. The last named however, is lacking in various essential properties, and the supply, too, is becoming exhausted. Marl and gypsum are abundant and cheap, but are also deficient in certain chemical ingredients.

The fact is now fully established that the basis and chief ingredient of soil fertility is phosphate of lime; that this substance enters largely into all vegetable and animal growth. How to replenish exhausted soils with phosphate of lime became a problem, whose practical solution would preserve intact their fertility, and even transform land, long barren through natural causes, into a soil prolific as a Western prairie. It was soon found, by scientific men interested in the welfare of humanity, that the most concentrated form in which phosphate of lime occurs is in the bones of animals. The problem was solved, and it was only necessary to provide means for turning to account the vast quantities of those bones which had previously been lost through ignorance of their value.

The first successful efforts in this country to utilize the bones of cattle for the manufacture of fertilizing material on an extensive scale, were made by Mr. Joseph Lister, who emigrated from England in 1842. He brought with him the first machine employed for grinding bones, and it is still in use. He was succeeded in the business by his two sons, Alfred and Edwin Lister, under the style of Lister Brothers, who, during 1850, laid the foundation in Newark for the establishment now known as the Passaic Carbon and Agricultural Chemical Works. The business has met with a continuous growth, and probably at the present time, the works referred to are the largest of the kind in the world. These results have been reached only through unremitting efforts and years of patient toil. In the early history of the enterprise great difficulties were encountered in overcoming the prejudice against the use of bone fertilizers. While the scientific few foresaw the great benefits which would ultimately

result from the use of bone phosphates in renewing the productiveness of worn-out lands, the masses of the people, who are the real consumers, have been slow to appreciate its importance. Now, however, its use is becoming general, and the farmers of the United States are more fully realizing what almost seems a beautiful law of nature, that the wealth of the soil is stored up in its most concentrated form, in the bones of animals, that it may be returned to the earth for man's benefit.

In successfully developing this branch of American industry, which lies at the very foundation of National wealth, the Messrs. Listers have performed a work which is no less important because its results are silent-working and devoid of all splendor and magnificence. For, grand as are the mighty workshops of the nation, the stupendous steam engine manufactories, the palatial cloth factories, and the immense machine works, the vast warehouses teeming with the triumphs of mechanical skill, and the great railways with their burdens of freight; grand as all these are, they are practically of trivial importance compared with the great life of a nation, which lies in the warming bosom of its soil, out of which the means of its existence must come; if this be barren the nation must crumble to decay, its workshops tumble to the ground, and the very railways and highways grow up with weeds.

Lister Brothers' Chemical Works are situated on the Passaic River, thus affording ample shipping facilities for receiving stock and the transportation of manufactured products. To facilitate their business the firm owns the handsome iron freight propeller Alfred and Edwin, and the propeller tug Sarah, both of which make daily trips between the works in Newark and the branch office in New York. The raw material used in the works is made up of cattle bones, gathered first, by the aid of teams, in New York and neighboring cities. Vast accumulations of bones are next brought from all parts of the country, consisting largely of buffalo bones from the far Western prairies. Lister Brothers were the first to begin the collection of bones from remote parts of the country. By this method two results are reached: decaying bones are offensive matter, and their collection is important from a sanitary point of view, while their value as fertilizing material has already been recorded. Cargoes of cattle bones are also received from South America. Their Works are supplied with the most improved machinery, and the manufacturing processes in use are mainly the result of the firm's own investigations and discoveries, constituting important triumphs in agricultural chemistry.

The allotted space does not permit of a detailed description of these methods. It is only possible to briefly mention the several productions derived from the raw material, already referred to. The most important, regarded specially in the light of the ultimate benefits to be derived from their more general use, are the several fertilizing materials, consisting of bone phosphates, ground bone, bone meal and bone flour, and known as Listers' Standard Fertilizers.

The bone phosphates constitute the most powerful fertilizing material known, being absolutely unequaled for the purpose named. Listers' Superphospate of Lime is pronounced by the leading chemists as the purest article of its kind. Inferior articles made from cheaper materials have been sold to consumers in lieu of the genuine article. The only sure reliance in such cases is the integrity and reputation of the manufacturers, and in this regard Messrs. Lister Brothers have established a just claim to preëminence.

The other brands of fertilizers mentioned differ from each other only in the degree of fineness to which they are ground. Opinions from consumers in all parts of the country testify to the great value of these fertilizers. They have thus far been mainly used in the Middle States, and Westchester county in New York State alone consumes each year over 1,000 tons of these invaluable articles. Their use is rapidly becoming greater in all parts of the country. As a means of recuperating the wasted energies of the Southern States their value is incalculable, and the now prolific Western prairies should be preserved in their original strength and fertility by a timely application of such powerful fertilizers as are made at these works. Mainly owing to superior methods of production and the comparative cheapness of material Lister Brothers are selling immense quantities of their products in the European markets. It is thus seen that the importance of this industry is constantly increasing, and that the Newark Carbon Works will play a still greater part in promoting the industry of the country and increasing the Nation's wealth.

In addition to the fertilizers, the cattle bones used at these works yield various other articles of great utility. As a result of the first process a superior quality of refined tallow is made, which is mainly used in the manufacture of fine toilet and other soaps. The other products are bone charcoal, used for clarifying sugar; also, glue and various chemical preparations, such as sulphate of ammonia, sulphurous acid, bi-sulphite of lime, carbolate of lime, etc.

The hands employed in the works number 300, and the summary of weekly wages is \$3,500. The value of annual production reaches \$1,000,000, and the firm's trade connections extend throughout the United States, to South America and many parts of Europe. It is a matter of just pride to the people of Newark that these stupendous results, contributing to the welfare of millions of people, have been attained within their city, and on the banks of their own beautiful Passaic.

CHARLES COOPER & CO., Clifford-street; Salesroom, 150 Chatham-street, New York. The above firm was established in Newark during 1858, and are manufacturing chemists, their productions mainly consisting of photographers' and glass makers' materials. The members of the firm are Messrs. Charles Cooper and Jacob Kleinhaus. The products comprise 87 different chemicals from oxide of manganese to nitrate of silver. The hands employed in the lab-

oratory number 20, and the weekly wages are \$250. The value of annual production is \$50,000.

D. B. COLES & SON, (Newark Chemical Works,) 51 to 55 Johnson-street. The manufactory known under the above style has been established since 1852. It was the first factory in Newark of its kind, and there are now but very few houses in the country engaged in the same line of production. Messrs. Coles & Son manufacture prussiate of potash, prussian blue, and cyanide of potassium. Their productions are sold to print works and woolen mills generally, to be used by them as coloring material. Fifteen hands are employed and the weekly wages amount to \$200, the value of yearly product being \$50,000.

COWEN & LEVISON, (Essex Chemical Manufg. Co.,) 112 to 122 Chestnut-street; Branch office, 207 Canal-street, New York. This manufactory has recently been established. The productions comprise cream of tartar, tartaric acid, and Rochelle salts. The enterprise bids fair to become a prominent part of Newark's industries. The capacity of these works is sufficient for an annual production of 1,000,000 pounds of chemicals, with an estimated value of from \$400,000 to \$500,000. At present 25 hands are employed, and the weekly pay roll is \$300.

- J. F. DODD, 181 to 185 Chestnut-street. The products of this manufactory consist exclusively of prussiate of potash. Thirteen hands are employed, and the weekly wages amount to \$175. The annual production of the article named amounts to 225,000 pounds, and it is valued at \$65,000. The goods are sold in all parts of the United States.
- J. G. HILL (New Jersey Lamp-Black Works), First-street; Office, 481 Broad-street. The extensive use of lamp black as a raw material in many of Newark's industries has been an important element in the growth of its manufacture in this city. Mainly to supply this demand the lamp-black works named above were established in 1856. Through the efforts of the present proprietor, Mr. J. G. Hill, the manufacture of this article has been so perfected that the fineness and high quality of Newark Lamp-black is unexcelled in the market. Although the main part of Mr. Hill's productions is sold in Newark, his refined lamp-black is favorably known in an extended market. It is largely used in Newark for the manufacture of rubber goods, enameled oil cloths, patent leather, etc. Six hands are employed in the factory, and the weekly pay roll is \$75, the value of annual production being \$30,000.

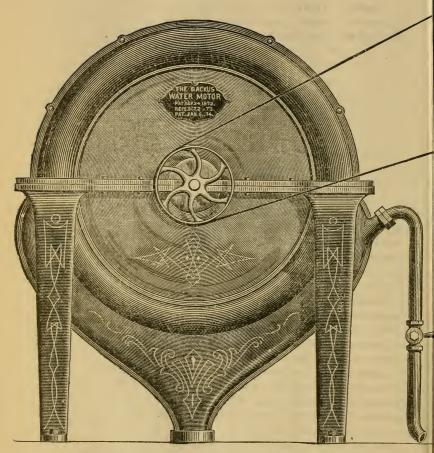
PASSAIC CHEMICAL WORKS, Foot of River-street; Agents, Joseph S. Leverett & Co., 85 John-street, New York. This manufactory was originally established in 1835, by Mr. W. T. Clough. The present Company was organized in 1872, and is incorporated under the general laws of New York State. The officers are as follows: President Burr Wakeman; Secretary, Charles A. Edwards;

Treasurer and Superintendent, Dr. F. Alexander. The products of the works consist of sulphuric acid and refined sulphur. These goods are sold in all parts of the United States and Canada, to oil refiners, chemical works, match factories, &c. The hands employed in the works number 50, and the weekly pay roll amounts to \$550. The annual product of acid is 6,000,000 pounds, and of sulphur 2,400,000 pounds, the total valuation being \$234,000. This is one of the largest concerns of the kind in the United States, there being only two others in the country producing the articles named.

WATER MOTOR MANUFACTORY.

BACKUS BROTHERS & CO., Wright-street and Avenue A. As an agent in propelling heavy machinery both water and steam have long been successfully applied, and in the direction named little more could be desired. Until very recently, however, no successful method had been devised for creating light power, which is at once thoroughly practical, economical, and of universal application. Happily for industrial advancement this defect is now entirely overcome by means of the Backus Water Motor, a mechanical device which is the more ingenious on account of its simplicity. This machine, illustrated on the next page, is the invention of Mr. Oscar J. Backus, a resident of Newark, and it may be described in general terms as a method of utilizing, for operating light machinery, the power contained in the pressure of the water in the supply pipes from the aqueducts or waterworks of towns and cities. The pressure of water flowing, through natural causes, from high elevations, as in mountain rills or springs, may also be used for operating the Backus motor.

This device consists simply of a light but firmly constructed galvanized iron wheel, provided on its outer rim with buckets at frequent intervals, and the whole enclosed in a water-tight iron casing. Through the casing an ordinary water pipe is so inserted that a stream of water from the pipe flowing downward, strikes the buckets at a right angle with the radius of the wheel. The aperture at the end of the pipe is comparatively small, and on this account the water is forced through and against the buckets with a percussion-like effect, thus imparting a rapid and steady motion to the wheel, and the water having produced the desired effect, passes downward into a waste pipe provided for its escape. Thus is secured a light power, which is available in every town and city having a water supply with a pressure of ten pounds to a square inch of surface, and also under favorable conditions otherwise provided.



THE BACKUS WATER MOTOR FOR LIGHT POWER, TO RUN BY HYDRANT PRESSURE.

The great practical benefits of the Backus motor are realized when it is known that it may be used for working nearly all machines which heretofore have required the application of hand or foot power; also, in general, as a more convenient and economical method for propelling light machinery.

As a power for driving sewing machines its great practical value can scarcely be overrated. It is a notorious fact that the continuous operation of a sewing machine with a treadle is very injurious to the health. As a means of obviating this difficulty the Backus motor is one of the first inventions of the age and a great blessing to all womankind. It can be applied to the single sewing machine for domestic use without the slightest difficulty. Thus used it requires no more room than the ordinary drive wheel, and the extra water pipe for supplying the power is of trifling moment. The speed is adjustable and is regulated by means of a valve in the pipe, which is opened or closed with a contrivance not unlike the common pedal. The resulting speed varies in the sewing machine from sixty stitches a minute to the highest number attained by steam power. It is also available in factories using great numbers of sewing machines, and the largest sized motor will operate twenty machines.

The practical applications of the Backus motor are almost numberless, a few of the principal uses aside from the one already mentioned are for running ordinary printing presses, turning lathes, and such machinery as used by jewelers, and those in kindred pursuits; also, for operating dental engines; as a power for running elevators in dwelling houses, coffee and drug mills, church organs, ice cream freezers, and everything requiring similar power. Where the power is available it will doubtless prove of great utility in the operation of dairies.

The general points of excellence of the Backus Water Motor may be briefly summarized as follows: First, its nominal cost, convenience and great durability; second, its noiseless running qualities; third, its availability, when shut off there is no waste, as occurs in ordinary steam boilers; fourth, its absolute safety and freedom from mechanical derangement.

Although recently perfected, the last patent having been granted in January of the present year, the Backus motor is already coming into extensive use. Its great ments have only to be seen to be appreciated. At the Cincinnati Exposition of the present autumn it received a bronze medal on account of its great practical value in the useful arts. Its popularity will no doubt continue until it is universally regarded as an indispensable article of domestic utility. The machine has been patented in England, and it will doubtless soon be introduced to the homes and workshops of Europe.

Their manufacture is carried on in Newark by the firm of Backus Bros. & Co., of which Mr. Oscar J. Backus, the inventor, is the senior partner. The business has been so recently established that the statistics could not be ascertained.

The demand, however, for these wonder working machines is constantly increasing. This invention deserves to be classed among the many valuable contributions which Newark has made to the industrial progress of America, and in bringing it to perfection Mr. Oscar J. Backus has proved himself a public benefactor.

ORNAMENTAL AND BENT GLASS WORKS:

The manufacture of glass is said to have been discovered by the Phœnicians. Pliny describes the circumstance as follows: "A company of Phœnician merchants having landed on the coast of Palestine, near the mouth of the river Belus, were preparing for their repast, and not finding any stones on which to place their pots, took some cakes of nitre from their merchandise for that purpose. The nitre being thus submitted to the action of the fire, with the sand on the shore, they together produced transparent streams of an unknown fluid, and such was the origin of glass."

In addition to the ordinary forms of glass and the common uses to which it is applied, it is curious what wonderful transformations take place in the original elements from which glass is made, when submitted, in a heated state, to the mysteries of the blow-pipe. By expert manipulation, and one or two simple tools, glass is manufactured into every conceivable shape and form. Animals, birds, ships, vases, boquets, elaborate toys and gorgeous flowers are among the wonders emanating from the workshops of the skillful artists in this material-Many curious styles in this manufacture are worthy of attention. Of these, the most important are various delicate scientific implements, glass globes, glass eyes, plate glass, etc. The most expert workers in glass are the Bohemians and Venetians, who manufacture fanciful work of the most exquisite forms. For graceful outline and ornamentation, these people surpass all other nations in this special department. The colored Bohemian glass has a richness and beauty of finish that is not diminished by constant use or lapse of time.

J. R. DENMAN, 71 to 75 Barbara-street; Office, 142 Mulberry-street. Quite a prominent part of Newark's industries is the manufacture of ornamental cut glass for windows, together with bent glass for carriages and other purposes, etc. The most prominent manufactory of this class is the one known under the above style. Mr. Denman began the manufacture of ornamental and bent glass in Newark during 1868. Since then, through energy

and a thorough knowledge of the business, the enterprise has rapidly grown into prominence, notwithstanding the fact that the business was established so recently. Mr. Denman makes a specialty of bent or curved glass, and in this direction his manufacturing facilities are unsurpassed, glass being bent as large as 120 inches, for offices, banks, show cases, etc. He also makes extensively, ornamental or cut glass for dwellings, churches, &c. These goods are sold in all parts of the United States and are exported to Cuba, Mexico, &c., the trade with these countries being direct from the manufactory. The working force of the factory in Barbara-street numbers 20 hands, and none but the most skillful are employed. The weekly pay roll is \$250, and the annual productions are valued at \$50,000.

BATTEN, DOWNING & CO., 580 to 586 Market-street; Office, 207 Hudson-street, New York. This house was established in 1858. Their business comprises the manufacture of engraved, cut, embossed, and bent glass, in all varieties. The productions of no other like firm covers so wide a field. The senior member of the firm, Mr. Charles L. Batten, is an acknowledged expert in this line, having been in the business from boyhood, and he is now 72 years old, although still active. He learned his trade with the well known English house of Chance Bros., near Birmingham. All the ornamental work of this firm is from their own designs, and they also manufacture the acid required in embossing glass. Their markets extend throughout the United States and Canada. Thirteen workmen are employed in the factory, and the weekly wages amount to \$200, the value of annual production being \$20,000.

BELCHER & POVEY, 65 Chambers-street; Salesroom, 13 West Broadway, New York. This well known firm is one of the oldest of its class in the country, and was established in 1845. The products comprise ornamental glass for churches, also white enameled and bent glass. Sales are made in all the principal cities of the United States, and also to South America and the West Indies. Fifteen hands are employed, and the weekly pay roll is \$300. The value of yearly product is \$25,000.

RULE MANUFACTORIES.

The use of the rule being necessary in nearly all mechanical operations their consumption is very great and the manufacture one of considerable importance. Rules are generally made of boxwood, and that used grows in Turkey and Southern Russia. The tree producing boxwood is small in size, the average diameter of the logs which reach this country being from six to seven inches,

and never more than fifteen. The boxwood imported is sold by weight, and the prices vary from \$30 to \$150 a ton. The value depending upon the texture, color and straightness of the grain. The color being an important consideration. The deeper the golden tint of the wood, the more valuable is it for making rules.

BELCHER BROTHERS & CO., 109 N. J. Railroad Avenue; salesroom, 94 Chambers-street, New York. This manufactory was originally established 50 years ago and after various successive changes the present firm succeeded to the business, and the above style was adopted. The productions of the house are well and favorably known to the trade throughout the country, and comprise guagers', counting house, desk and lumber rules; also, yard-sticks and shoemakers' size sticks.

Messrs. Belcher Brothers & Co., are the largest manufacturers of Rules in New Jersey. The statistics of this manufactory have been included in the the general summary.

TINGLEY & CO., 7 N. J. Railroad Avenue. The rule manufactory known under the above style was established in 1868. The productions are counting house rules exclusively, and they are largely sold in all the principal cities of the country, and to the United States Government. Goods are sold to the trade only. The statistics of the factory will be found in the general summary.

BROOM MANUFACTORY.

The broom is of such universal application as an article of domestic use that little needs to be said of its manufacture. It is interesting to note, however, that the name of this article comes from a shrub, formerly used in England for sweeping, and which was called broom. The chief material of which brooms is made is a kind of sorghum called broom corn. It is supposed to be a native of China or India, but is now widely cultivated in Europe and America. It grows from six to twelve feet high, and has a jointed stem like a reed, with a bushy top, of which the brooms are made. The stock is hard and dry without nutriment, and is of little value. It is cultivated on a large scale and with great care in China, reaching there an astonishing size, the stalks being sufficiently solid and strong for the construction of palings and farm houses. The seeds produced are eaten in China by the poorer classes, and in addition a liquor, containing a large portion of alcohol, is distilled from them. In this country broom corn is in great part grown in the Western States, and from there also the handles

mainly come. In the manufacture of brooms the machinery used consists simply of a wood roller turned by a crank for the purpose of winding the cord on the handle. One hand holds the broom handle, and while winding on the twine the brush is supplied with the other hand.

I. D. WEED, 106 Market-street. The business of broom making as carried on at this manufactory was begun by Mr. Weed in 1851. The productions comprise corn brooms in all varieties, and are well known for the excellence of material used and fidelity in manufacture. Eight hands are employed in the factory, and the weekly pay roll is \$90, the annual production being valued at \$60,000. The products are mainly sold in the home and near-by markets.

OIL MANUFACTORY.

McKIRGAN & CO. (Passaic Oil Works), foot of Third Avenue. The business of refining crude petroleum is carried on in Newark by the above firm. The works were established in 1864, and the members of the firm are Messrs. Wm. H. and Thomas F. McKirgan. The oil refined by them amounts to 300 barrels per week, the value of annual product being \$100.000. Eight hands are employed in the factory, and the weekly pay roll is \$150.

The productions comprise refined kerosene of the highest standard, together with deodorized naphtha, gasoline, etc.

COTTON THREAD MANUFACTORIES.

CLARK THREAD COMPANY, Passaic-street; Salesroom, 337 Canal-street, New York. Probably no other branch of American industry has attained to greater supremacy than the manufacture of spool cotton. Thread making in the United States dates from the close of the last century, when the first efforts were made in Bridgewater, Mass. The cotton thread manufacturers of this country have reached such a high degree of excellence that the imported article is no longer regarded as having points of superiority.

The thread works are among the largest manufacturing establishments of the country, and of these doubtless the largest is located in Newark, and known as

the Clark Thread Company. To be thus distinguished is a great credit to this city.

While the business conducted under the above style is now entirely an American enterprise, its establishment dates from 1812, at Paisley, Scotland. The first efforts were made by Mr. James Clark at that date, and the business has been continued from that time by different members of the same family. During 1864 this house began business in Newark, and at the commencement the processes of finishing and spooling only were carried on here, as the thread was brought from Scotland. The style of the firm at that time was Geo. A. Clark & Brothers. In the following year, 1865, the Clark Thread Company was incorporated under the laws of New Jersey, and the business of manufacturing thread from the raw material was then begun on this side of the Atlantic. From that time few similar enterprises have met with greater success. Clark's thread has rapidly taken precedence over all competition, and the Company's trade mark, "O. N. T.," has become a "household word" in every part of the United States. These results have been mainly due to the great energy and foresight of Mr. Geo. A. Clark, the master spirit of the enterprise. The ability displayed by Mr. Clark in building up in this country so great an industry, during so short a time, has seldom been equaled. After seeing the business, which he had been so instrumental in establishing, attain to the first place in the thread industry of America, Mr. Clark died in February, 1873. The manufactory in this city and the extensive trade connections of the Company are an enduring monument to his great genius and labor.

The officers of the Clark Thread Company are as follows: President, Lewis Coleman of Boston; Treasurer, Wm. Clark. In addition to the energy of Mr. Geo. A. Clark, an important element in the growth of this Company's business has been a fidelity in manufacturing processes, and a constant adherence to the finest quality of goods. Clark's "O. N. T." thread is recommended by the leading sewing machine companies, and is everywhere regarded as the best. To show the great extent and prosperity of this manufactory, it is only necessary to state that at the present time 1,050 operatives are in the employ of the Company, and the weekly summary of wages is \$8,500, or \$442,000 per year for wages alone. The value of yearly production is over \$2,500,000, though it has been placed at that amount in the statistical summary. The manufacturing operations of these immense works are under the direction of the Superintendent, Mr. William Clark.

SINCLAIR & McCLELLAN, (Union Thread Mills,) Nassau and Sheffield streets; Agents, Arnold & Banning, 56 Lispenard-street, New York. The thread manufactory known under the above style was established in 1868. The products comprise all varieties of spool cottons. Thirty hands are employed, and the weekly pay roll is \$300, the value of annual production being \$90,000.

LUBRICATOR MANUFACTORY.

NEWARK LUBRICATING COMPANY, Chestnut and McWhorter streets. This business was established in 1871 and the products are Crogan's patent lubricating compound, for railway car journals, together with superior axle grease, etc. The advantages claimed for the compound are perfect lubrication, safety, economy, adaptability and cleanliness. It keeps all grit and dirt from the boxes and bearings, and saves wear of journal brasses. Nearly all the horse railways of the country use it; also the Alleghany Valley Railroad. The factory gives employment to three hands, the weekly wages being \$30. The compound named is manufactured yearly to the value of \$15,000. This, however, does not represent the total business of the Company, as they are general dealers in machinery oil, etc.

PIANO-FORTE MANUFACTORY.

HINDS & SONS, 21 and 23 Bank-street. It is said that the idea of the piano forte was first conceived independently at the same time by three persons in different parts of Europe: a German organist by the name of Schroter, Marius, a French harpsichord maker, and Bartolomea Cristofali, a harpsichord maker of Padua. Priority in point of invention is due to the Italian maker—1714 Schroter's discovery was followed up in Germany by Silberman of Strasburg, Spat of Ratisbon, Stein of Augsberry, and others. The first piano-forte scen in England was made at Rome by Father Wood, an English monk.

Although music as an art reaches its highest perfection in Europe, and especially Germany, the superior skill of American artizans has enabled piano-forte manufacturers in this country to greatly excel their European rivals. Through the efforts of the above firm the industries of Newark now include the manufacture of first-class pianos.

Messrs. Hinds & Sons began piano making in Newark during 1865. The senior member of the firm, Mr. Silas P. Hinds, having previously had valuable experience in the business, was enabled to introduce improved methods of manufacture. The other members of the firm are his two sons, Messrs. Alpheus R.

and William H. Hinds. Their processes of manufacture have been so perfected that the "Hinds & Sons" pianos are now regarded as unexcelled for quality of tone and durability. Their superiority is generally acknowledged. Testimonials as to their unrivaled qualities are freely given by the leading musicians of Newark and other cities. It is a great credit to the City of Newark that a branch of industry so nearly allied to art as piano making should reach perfection here. The pianos made by Messrs. Hinds & Sons are mainly sold in the home and near-by markets. The factory is in the rear of their warerooms at the location named above. Twenty five hands are employed and the weekly wages amount to \$350. The yearly production of pianos is valued at \$50,000.

STATIONERS' SPECIALTIES.

CORNWELL MANUFACTURING COMPANY, N. J. Railroad Avenue and Cottage-street. Next in importance to the industrial developments which are the outgrowth of new discoveries or inventions, should be classed those enterprises whose purpose is the production of various articles of utility and ornament, which previously had been made in a desultory way, on a more extensive scale, by improved methods and at a less cost of production. An illustration of these facts is the manufacture of what is known as Stationery Specialties, such as bill-holders, letter-files, etc.

That the production of these goods has been reduced to a system is mainly due to the foresight and energy of Mr. George W. Plummer who saw how improvements could be made in their manufacture, and that by combining the making of so many useful articles in one factory the inconvenience and the cost of production would be materially lessened.

Mr. Plummer began the manufacture of these goods in 1872, and soon after, through his efforts, the Cornwell Manufacturing Company was organized under the general laws of New York State, with Mr. Plummer as a joint stockholder and business manager, the President of the Company being Mr. James F. Bull, of New York.

The wants of the trade and the needs of consumers had been accurately fore-seen, and on this account the business of the Company rapidly increased, new lines of production were entered upon, and ere long greater manufacturing facilities were required. To secure these a new and commodious factory has been built at the above location, on the line of the Pennsylvania Railroad. The factory is a substantial three-story and basement brick structure with special adaptations to the business from Mr. Plummer's own plans and designs.

The Company's productions are mainly known as Stationers' Case Goods, comprising bill-holders, reference and letter-files, mercantile, walnut, paste-board, commercial note, telegraph, nonpareil and insurance clips; arm rests, desk weights in various styles, etc. The variety of goods named very inadequately represent the Company's business in the line of stationers' supplies, as they are continually entering upon other fields of production, special effort being made to supply any needed demand, and they thus cater to the wants of the trade.

The manufacture of superior sealing-wax is just now becoming an important part of the business. The various styles of goods named above are noted for convenience and elegant finish, many of them being from original designs, and to some extent covered by patents. New ideas are constantly being reduced to practical form, and articles long in use are improved and perfected by this company, their efforts being constantly in the direction of better grades of goods, and at a less cost of production. A novel and useful article introduced by them is an improved paper file. These bands are made in all conceivable styles. A special variety is made for glove manufacturers, superceding pins and strings, and for binding gloves they surpass anything yet invented. This Company is also manufacturing a variety of desirable goods known as school supplies, such as black-board rubbers, numeral frames, etc., and special lines of fancy goods are also made.

The Company sells only to jobbers, and its trade is constantly increasing, this being the only concern in the country manufacturing this class of goods on an extensive scale. The factory is provided with a great amount of laborsaving machinery, and facilities for the employment of 400 hands. The yearly production is rapidly increasing, and already sales are made to wholesale stationers in nearly all parts of the country.

WIRE FERRULE MANUFACTORY.

CHAS. E. GREEN, 78 Chestnut-street. The products of this manufactory are wire ferrules for paint brushes, and the business was established in 1871. These ferrules are now regarded as unequalled for the purpose named. The old method of using twine for ferrules is now entirely out of use. Mr. Chas. E. Green was the pioneer in this branch of industry. His ferrules are sold to brush manufacturers in all parts of the country, but principally in Philadelphia, New York and Brooklyn. Four hands are employed in the factory, the weekly pay roll is \$30. The daily product is 2,000 ferrules, and the value of yearly production is \$10,000.

RUSSIALINE MANUFACTORY.

AMERICAN RUSSIALINE COMPANY, 108 to 114 N. J. Railroad Avenue. The products of this manufactory are an innovation in the industry of the country. Russialine closely resembles Russia leather in appearance, and the body of the article is paper, the durability and general merits being the result of patent processes by Mr. M. W. Brown. The business was established during the present year and the Company is organized under the general laws of New York State. Russialine is in general an economical and attractive substitute for leather. It is well adapted for the manufacture of pocket books, and for book-binders and hatters use, and it may also be employed for making trunks and bags. It is mainly produced with machinery. Russialine is sold in all parts of the country, and an exporting demand for the article has already arisen. Mr. H. N. Brown is Superintendent of the factory, and the hands employed number 18, the weekly pay roll being \$234. Russialine is meeting with such general favor that at the present rate the value of annual production will be \$90,000.

INK, SEALING-WAX AND MUCILAGE MANUFACTORY.

R. B. DOVELL'S SON, 88 McWhorter-street; Salesroom, 110 William-street, New York. The manufacture of fine and durable inks is an important branch of industry. Much difficulty has been experienced ever since the article was first made in securing those qualities of ink which impart both brilliancy of color and durability. The manufacturers who have succeeded in producing the desired qualities of ink have been few indeed. Many spurious inks have been thrust upon the market, and on this account it is well to know those manufacturers who have reached the fullest success in the manufacture of fine grades of inks.

The manufactory in Newark conducted under the above style was originally established 50 years ago in London, England. In 1844 the business was transferred to this country, and since then it has been a prominent branch of American

industry. Since the death of the founder, Mr. R. B. Dovell, the son has succeeded to the business, and the above style adopted.

The productions of the manufactory comprise all varieties of black and colored inks and writing fluids; also, sealing-wax, mucilage, wafers, etc. Dovell's inks are unexcelled either by American or foreign productions. Through the efforts of the senior Mr. Dovell and his successors Americans are under no necessity of using imported inks. The mucilage and sealing-wax made by this firm are everywhere favorably known both to the trade and consumers. Attorney's seals and other like articles are also made. The goods are sold exclusively to the trade, and the markets extend to all parts of the United States. Fourteen hands are employed, the weekly pay roll being \$150. The several productions of this manufactory have a total value of \$100,000 annually.

PAINT MANUFACTORIES.

Paints in general include the coarse and fine paints used in ship and house painting, and for interior decorations; artists' colors, which are oil colors prepared with greater care: and water colors, which are mixed with gum instead of oil, and dried in cakes, and for using are wet with water and rubbed on porcelain cakes, For artists' colors, the whites, known as flake white, silver white, Venice white, etc., are prepared from ceruse, or carbonate of the oxide of lead, from zinc white, or from ceruse and sulphate of barytes. Oxides of iron and different mineral substances furnish yellows. Reds are supplied from vegetable substances, oxides, and mercury. Oxide of cromium, terre verte, and different salts of copper give greens. The blacks are from lampblack, which is procured by burning oils and other organic stubstances in close rooms or vessels and collecting the carbonaceous deposit; from calcined bones, and from the mineral peroxide of manganese. Various shades are produced by skillful mixing, and the principal requisite for perfect paints is thorough grinding.

ISRAEL BALDWIN, (Newark Paint Works), 362 Plane-street. The manufacture of paints was begun in Newark by Israel Baldwin, in 1850. Mr Baldwin died during the present year, after seeing the business which he founded grow to its present extended proportions. He did much to advance the growth and prosperity of Newark as an industrial city. Since his death the business has been continued by the estate under the same style. The productions comprise paints, colors and varnishes. The Baldwin brand of "Stag's Head" white lead is unexcelled by any other second quality lead in the market. The produc-

tions are sold to the trade in all parts of the country. Three hands are ememployed in the factory, the weekly pay roll being \$50, and the value of annual products is \$75,000.

TUERS & COOPER, (Oraton Paint Works), opposite Morris & Essex Railroad Depot; Salesroom, 79 Maiden Lane, New York. This manufactory was established in 1863, by the firm of Boylan & Tuers. In 1869 the present firm was organized, and its members are Messrs. Sylvester P. Tuers and Sylvanus Cooper. The products of the factory are white lead, zinc paints, colors, etc. This firm's brands of white lead are well known to the trade as, (1) "Oraton," (2) "Premium Pure," (3) "City Parlor," and (4) "Merchants." These brands are unsurpassed, and in fact are scarcely equaled in the market. Messrs. Tuers & Cooper, by their constant efforts in the direction of improved grades and better qualities, have done much to perfect this branch of industry. Sales are made from the firm's warerooms in New York. In the Newark factory eight hands are employed, and the weekly pay roll is \$130, the value of annual production being \$75,000.

BRUSH MANUFACTORIES. "

A. F. CONERY, 922 Broad-street. Among the nations of antiquity brushes as now made were unknown. In modern times they are made from a great variety of materials, from the wire brush for cleaning the surface of metals, to the camel's hair brush for artists's use. The bristles used in brushmaking are chiefly obtained from hogs in the north of Europe. The largest proportion comes from Russia, which country contributes nearly five-sixths of the entire supply.

While the brush industry of Newark is not of so great importance as other interests as regards the gross amount of production, Newark brushes are well known for their superior qualities.

The brush manufactory known under the above style is the largest of its kind in Newark. The business was established in 1857 by the firm of Dean & Conery, and in 1864 Mr. A. F. Conery became sole proprietor. His productions comprise brushes in all varieties and all of the finest qualities known to the market. The materials used are of the best imported stock, and only the most improved processes of manufacture are employed. Mr. Conery's trade extends both to the jobber and consumer, and special orders from manufacturers or otherwise are promptly executed. Sales extend to all parts of the country from

Maine to California. Thirty hands are employed in the factory, and the weekly pay roll is \$250. The value of annual production is \$50,000.

E. &. W. DIXON, (Newark Brush Manufactory), 5 Commerce-street. This is one of the oldest brush factories in Newark, and was established in 1854 by Leonard & Dixon. The present firm was organized in 1864. The products comprise all kinds of brushes for domestic purposes, and the several varieties required for manufacturers' use. The members of the firm are practical brush makers and they personally supervise the operations of their factory. The goods produced are extensively sold to Newark manufacturers and the near-by trade. The working force of the factory numbers 18 hands, and the weekly wages amount to \$175. The value of annual production is \$25,000.

H. WARRICK, 123 Newark-street. The products of this manufactory are leather-back horse brushes exclusively. An extensive trade is carried on in these goods, and they are regarded as a superior article of the kind. Twelve hands are employed, and the weekly pay roll is \$125. The value of yearly product is \$20,000. Fully one-half of the goods are sold to jobbers, and mainly in the West, Ohio, Illinois, and Wisconsin being the principal markets.

TELEGRAPH INSTRUMENT MANUFACTORY.

EDISON & MURRAY, 10 and 12 Ward-street. Within the last few years Newark has been the location of important developments in the science of telegraphy and the manufacture of electrical apparatus. This branch of industry was first attempted in Newark during 1869, in a small factory at 15 N. J. Railroad Avenue. Soon after a removal was made to the commodious factory at the location first named above. The present firm is composed of Messrs. Thomas A. Edison and Joseph T. Murray. The senior member, Mr. Edison, is the well known telegraph engineer, and his several inventions form important contributions to the science of telegraphy.

In 1870 he invented his Gold and Stock reporting telegraph instrument, now used so extensively in Wall-street for telegraphing from the Stock Exchange the sales of gold and stock to some 900 brokers' offices, etc., in New York. The peculiarity of this instrument is that the despatches are received and recorded automatically. It is in use in other large cities of the Union, as well as in the London and Continental Stock Exchanges. Thirty-six hundred of these machines have been made within the last three years, many of which have been

exported to Europe, where their use is constantly increasing. Messrs. Edison & Murray are the sole manufacturers of this instrument and to facilitate and cheapen its production they have introduced valuable labor saving machinery and ingeniously devised tools. In this way the parts of the machine are made "interchangeable," as in a Remington gun.

The use of the magnetic telegraph, as a means of transmitting intelligence, increased so rapidly during recent years that, in the large cities of this country and also in Europe, great difficulty has been experienced in providing sufficient wires and operators for the telegraphic business of metropolitan cities. The cause of this difficulty has been that by the Morse system the transmission of a single message employed a single wire entirely. To remedy these defects and avoid the expense of erecting new wires, Mr. Thomas A. Edison has perfected inventions whose value as a means of facilitating the transmission of intelligence by electricity can scarcely be overestimated,

The minor invention which Mr. Edison has contributed to the science of telegraphy is known as the Quadruplex Telegraph, now in use by the Western Union Telegraph Company. By this device four messages are sent over one wire in various directions, at the same time, without interference with each other. It is readily seen that by this method the working capacity of every telegraph wire in the country can be instantly quadrupled.

The most important result, however, of Mr. Edison's genius and inventive skill, is known as the American Automatic Telegraph System. Many electricians have previously attempted to telegraph automatically. It remained for Mr. Edison to perfect a system, and by his method the capacity of a single wire for the transmission of messages may be almost indefinately increased, this showing its great value at a glance, as by its use the great expense for the erection of new wires is entirely obviated, not to speak of numerous other advantages. The salient features of the Automatic System are as follows: Preparatory to transmission, the message is prepared by special machines, with which round holes, representing the telegraphic characters, and hence, the letters and words of a message, are punched in a continuous strip of paper. The strip of paper containing the several groups of holes is then taken to the transmitting machine, which consists of a revolving drum upon which rests a metallic point. This point is connected to the line, while the drum is connected to the battery and thence with the earth

If the end of the strip of paper be put in the machine it passes through it like a flash. The point referred to rests on the passing slip of paper, and the latter being a non-conductor the circuit is thereby broken; but, the moment a hole occurs, the point, falling through, comes in contact with the drum, thus forming a connection with the battery, when, the circuit being completed a wave of electricity passes over the wire and records itself at the receiving office as a dot on a continuous strip of paper moistened with a chemical solution, and

the effect of the electricity in passing through it is to make or form "ink." As there are large and small holes in the perforated paper, long and short marks are made upon the moistened paper thus forming the dots and dashes of the Morse alphabet. As the speed with which signals can be transmitted is practically unlimited it follows that by employing many perforating operators, 20 to 30 times as much intelligence can be transmitted as on a Morse wire or as much as thirty wires by the Morse system can accomplish. The Automatic telegraph is now successfully working between New York and Washington and other lines are soon to be built in this country, and it is destined to become a powerful competitor against the Western Union Company. Four sets of the Automatic system are in use by the British Post Office between London and Dublin and upon the submarine telegraph from Falmouth, England, to Vigo, Spain.

The Automatic apparatus is manufactured by Messrs. Edison & Murray. It is highly creditable to the city of Newark that such grand results should be achieved within her limits..

Messrs. Edison & Murray also manufacture mirror and marine galvanometers, inductive coils, secondary batteries and similar apparatus. This is the largest manufactory of its kind in the country. The production for 1873 amounted in value to \$200,000 with a working force of 70 hands, the weekly pay roll being \$750.

MARBLE AND STONE WORKS.

J. J. SPURR, 253 and 259 Market-street. The marble and stone works known under the above style was established in 1861 by the firm of Brown & Company. Mr. J. J. Spurr, who had been associated in the business from its inception, became sole proprietor in 1868. The business as conducted by Mr. Spurr comprises the manufacture of monumental work for cemeteries, &c., marble mantels, and stone cutting for general architectural purposes. The marble work is nowhere excelled. The elements of Mr. Spurr's great success in this direction is his rare artistic skill in originating and executing new designs. His establishment is finely appointed throughout with stone cutting machinery. The trade in marble work extends to neighboring towns of New Jersey.

An important feature of Mr. Spurr's business is contracting for cut stone to be used for buildings, churches, &c. He does a large amount of this work from Belleville and Newark brown stone for New York and other neighboring cities. He is the principal producer of cut stone in Newark, and also works in granite

and caen stone. The force employed numbers 50 men, and the weekly wages are \$1,000. The yearly production of marble work, etc., is valued at \$90,000.

PASSMORE & MEEKER, 192 Market-street. Unsuccessful efforts were made to secure the statistics of this firm, the required information being refused.

RUBBER COATED HARNESS TRIMMING MANUFACTORY.

THE RUBBER COATED HARNESS TRIMMING COMPANY, Prospect and Ferry streets. A later and important result of the application of caoutchouc, or India rubber, in the useful arts is the manufacture of hard-rubber coated harness trimmings. This industry is the result of inventions by Mr. A. Albright, first patented February 12, 1867, though five successive patents were afterwards issued to the inventor. Experiments were made for two years before the process was brought to its present state of perfection. Like many similar attempts with other inventions, the first efforts of the inventor to introduce his harness trimmings to public favor were only partially successful. The harness makers at first ridiculed the idea, and only after energy and perseverance had surmounted these obstacles, were trade prejudices overcome, and a demand for rubber-coated trimmings established. Their merit is now acknowledged by the trade.

The process of manufacture is very simple, the iron castings being enveloped in little strips of soft rubber, cut in particular patterns so as to cover all the corners and angles. Thus prepared the article is baked in an oven heated to about 300 degrees, after which it is placed in a die and subjected to powerful pressure, thus securing the proper shape and curves, and, also, a beautiful imitation of stitches as they appear in leather work.

The first efforts at manufacturing the rubber-coated trimming were made at New Brunswick, N. J., in 1868, and after assurances as to the value of the new industry, the commodious factory at the above location was built in 1870, and it is now the only hard rubber trimming manufactory in the world. Rubber coated trimmings are more expensive than the leather covered article, but the greater durability claimed for the former, renders them cheaper in the long

run. By coating with rubber the ruinous rotting of stitches is avoided. Assurances of the superiority of these goods are received by the Company from various parts of the country. Their trade extends over a large territory, and this is the more creditable, as scarcely any efforts have been made to advertise the goods, their merits being sufficient to effect sales.

The main success of the enterprise dates from 1868, when Mr. L. C. Voorhees became a prominent member of the Company, and its increasing prosperity has been largely due to his business foresight and careful management.

They also manufacture rubber coated carriage trimmings and mountings, including a large variety of coach handles, nuts, pole tips, &c.

The working force of the factory numbers 80 men, and the weekly pay roll is \$1,000. At the present rate of production the yearly manufacture is valued at \$150,000.

RUBBER MANUFACTORY,

NEWARK INDIA RUBBER MANUFACTURING COMPANY, 98 Warrenstreet. The products of this factory are men's rubber boots and shoes. The hands employed number 250, but further information was respectfully refused by the gentleman in charge of the establishment.

- L. JOY & COMPANY, 56 to 66 Searing-street. Efforts to secure the statistics of this manufactory were unsuccessful. The senior proprietor in reply to inquiries, said that he considered such a work as this as of no importance.
- C. ROBERTS, New and Colden-streets. The products of this manufactory are stationers' rubber goods and a variety of articles made from vulcanized india rubber. The production of the goods first named constitute an important part of the rubber industry of the country. Mr. Christopher Roberts began the manufacture of goods in Providence, R. I., during 1854, and soon after removed to Newark. An exporting trade in stationers' goods is carried on with Germany, and the vulcanized rubber articles made are sold to druggists throughout the country. Mr. Roberts is one of the largest manufacturers of the country in his special field of production. The statistics of his factory are included in the general summary.

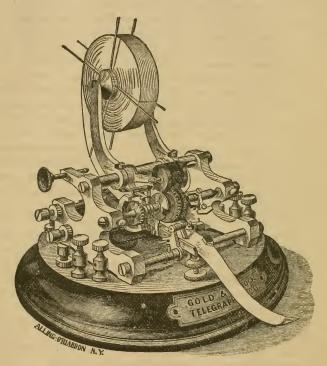
LIME AND CEMENT MANUFACTORY.

THE NEWARK LIME AND CEMENT MANUFACTURING COMPANY, Foot of Bridge-street. The business of the above Company in the production of lime and cement forms an important branch of Newark's manufactures. The business was established in 1840, under the firm name of Tompkins, Hedden & Co. The present proprietors are an incorporated Company, and the officers are as follows: President, Walter Tompkins; Secretary, Samnel C. Jones. The productions comprise hydraulic cement, calcined plaster, marble dust, lime ground plaster for farmers' use, etc. A large part of the manufacturing is carried on at Rondout, New York. The raw material used by this Company comes from Ulster county, New York, and various parts of this country, and also from New Brunswick, Nova Scotia, Ireland, etc. The reputation of this firm for manufacturing only the standard and uniform qualities of the goods named, is everywhere acknowledged. The usual working force of the Newark factory numbers 100 hands, and the weekly pay roll is \$900. The yearly business of the Company amounts to \$350,000, and their sales extend to nearly all parts of the United States.

ULTRAMARINE BLUE MANUFACTORY.

HELLER, MERZ & CO., Hamburg Place; Salesroom, 72 William-street, New York. Among the important branches of Newark industry may be named the manufacture of ultramarine blue by the above firm. This establishment is the only one of the kind in the United States, and hence its productions are largely sold in all parts of the country. The house of Heller, Merz & Co. was established in 1869, and the firm have rapidly grown into prominence, the value of their annual products having already reached \$150,000. Twenty-six hands are employed in the factory, with a weekly pay roll of \$350.

Ultramarine Blue is an invaluable production to many branches of American manufactures. It is principally used in the manufacture of paints, paper hangings, and in cotton factories; it also enters into sugar, starch, soap, candles, etc., and many other are the uses it is put to. An exporting demand has already been established with Cuba and South America.



EDISON'S STOCK AND GOLD REPORTING TELEGRAPH INSTRUMENT.

BELLEVILLE AND NEWARK STONE QUARRIES.

The brown sandstones of the Eastern and Middle States have long been extensively used for building purposes. Those familiar with the architectural appearance of New York will readily recall the miles of brown sandstone fronts with which that city abounds. It is attractive as a building material, and when durable nothing could be more appropriate for general architectural purposes than the brown stone referred to. The main supply of this stone has heretofore been taken from the quarries on the Connecticut River, at Portland, Conn.

The desirable qualities of the brown stone which abounds in the vicinity of Newark have long been acknowledged. Many of the elegant private residences on Broad-street in this city are built of this stone. While the use of this stone has been extensive, its superior qualities only need to become better known to insure a greatly increased consumption. It is interesting in this connection to note an incident in the early history of New York, to show how valuable possessions near at hand are neglected for fancied treasures at more remote points. The Dutch of New York who imported yellow bricks from Holland, in 1648, put stone on the free list to encourage its introduction from abroad, when literal "free stone" might have been had for the quarrying close by in New Jersey.

The quarrying of the brown stone of Newark and at Belleville, a suburb of this city, is an important industry and a means of greatly adding to the wealth of Newark. This stone is largely shipped to other parts of New Jersey, to New York City and State, and elsewhere. The work of dressing sandstone gives employment to large numbers of men, and is a prominent industry of itself.

The Belleville Quarries are generally ackowledged as producing the finest qualities of this stone. It is especially free from the defects which characterize the Connecticut stone, which latter, in a few years, owing to its stratified character, scales off aud crumbles away. The appearance and durability of the Belleville stone are both superior, and it is unexcelled by any similar stone in the country for general architectural purposes. It is largely used in New York City and State for building and monumental purposes. The Belleville Quarries are now being fully developed by the Belleville Quarry Company, a corporation organized during the present year. Its stockholders are several prominent Newark gentlemen, among whom may be mentioned Mr. John McGregor, President of the Newark Dime Savings Bank. The officers of the Company are as follows: President, John B. I. Robison; Secretary, Moses T. Baker. This Company has introduced steam machinery and other means for facilitating the quarrying

of stone. They have opened new veins, whereby better qualities have been developed, and they are now ready to supply the superior Belleville free-stone to any extent. The supply being practically inexhaustible, the business will doubtless rapidly increase and extend over a larger area of country. The office of the Belleville Quarry Company is at 810 Broad-street.

The Newark stone proper is quarried near the corner of Bloomfield and Mt. Prospect Avenues. They are known as the Essex and Newark Quarries. Mr. Robert Matches is proprietor of the former, and Mr. Philip Hoehnle of the latter. The stone from the last named quarry is especially adapted for eclesiastical architecture. As a Newark industry the quarrying of brown sandstone will doubtless greatly increase in coming years.

CORSET MANUFACTORY.

JAMES BOWERS & CO., (Newark Corset Company,) 106 and 108 Mulberry-street. Through the efforts of the above firm the manufacture of corsets is now an important branch of Newark's industries. The business was established seven years ago, and the above style was adopted in 1873. The members of the present firm are Messrs. James and John R. Bowers. The productions comprise women's corsets and children's waists; also, patent corset clasps, introduced by the firm and known as the "Champion Clasp." The firm's business extends to all parts of the country, and their goods are everywhere favorably known to the trade. They are now among the largest corset manufacturers in the United States, and their business is constantly increasing; so much so that an enlargment of manufacturing facilities is now under way. The working force of the factory proper numbers 150 hands, their weekly wages being \$1,000. Outside of the factory, however, additional labor is employed. The value of annual production reaches \$150,000.

HAT MANUFACTORIES.

While the use of the hat for covering the head was doubtless cotemporary with the dawn of civilization, it came into greater prominence during the Middle Ages, when social distinctions were more sharply drawn and defined. The

form of the hat indicated the social position of the wearer. In these days of democratic equality emblems of such a character are little needed. The hat, however, is still considered a necessary article of wearing apparel, and so much so that Oliver Wendell Holmes was led to remark:

"Virtue may flourish in an old cravat,
But man and nature scorn the shocking hat."

The manufacture of hats in the United States commenced soon after the colonial settlement of the country. As early as 1662 the government of Virginia offered a premium of ten pounds of tobacco, the currency of that time, for every good hat of wool or fur made in the Province.

Valuable improvements in hat manufacturing machinery have been made in this country, and American hats are nowhere excelled. While importations from Europe of silk hats no doubt occur, the demand is slight and mainly based on erroneous notions or fancied superiority. For lightness and superior finish the silk hats made in this country are unequaled.

Newark was one of the first cities in the country to achieve distinction in the production of hats. It is still one of her most prominent industries, and perhaps no other point in the country surpasses this city in the amount of hats manufactured. As regards the high quality of the hats produced, Newark is unequalled. The hats manufactured here comprise all the fine grades of fur hats. It is left to other towns to produce the cheap varieties of these goods.

In the hat trade, as in some other lines of production, the facts relating to the amount of goods produced, cannot easily be obtained. This difficulty is caused by the custom of manufacturing on commission. A few large houses in the country supply the raw material to several factories, pay a stipulated commission for manufacturing. It is thus seen how the task of collecting statistics of all these minor establishments is beset with unusual difficulties. In the following pages mention is made of those firms which buy the raw material and sell their own productions. This at first sight may seem unsatisfactory, but to do otherwise and secure accurate results would be impossible. In addition, however, to the results thus reached, the remaining statistics of the hat interest of Newark have been carefully estimated, by the aid of a prominent manufacturer familiar with all the details of athe industry, and will be found embodied in the general summary.

C. B. ALSTON & CO., 39 to 43 Liberty-street. This manufactory was established in 1860, and the members of the present firm are Messrs. Charles B. Allston and Bethuel D. Baldwin. The productions comprise the finest grades of men's fur hats, and the goods are sold to the trade. The statistics relating to this manufactory are placed in the general summary.

GOOD & MERCY, 8 to 14 Beaver-street; Salesroom, 112 and 114 Wooster-street, New York. This house was established in 1864, and the above style adopted in 1873. The members of the present firm are Messrs. James W. Good and Meyer Mercy. They have at the above location an extensive hat factory conducted under the name of the firm, but the work done here in no sense represents their whole business, for it comprises the productions of several other factories in Newark and elsewhere. At Orange, N. J., and Danbury, Conn., factories are constantly at work for this firm. Their business comprises the manufacture of all grades of fur hats, from the cheaper varieties to the finest goods produced. Sales are made to jobbers throughout the country and the firm exports hats to Cuba. The hands employed in the Newark factory proper number 200, and the weekly wages amount to \$2,000. The value of annual product is \$225,000, exclusive of the firm's productions in other Newark factories conducted under other styles. These would increase the amount named to \$350,000, not to speak of their operations at Orange and Danbury.

TAYLOR & SEELEY, 285 N. J. Railroad Avenue; Salesroom, 66 Greenstreet, New York. This house handles the productions of several factories, and in addition have in this city a manufactory of their own, where are produced a general variety of fine and medium grade men's fur hats. The hands employed number 80, and the weekly pay roll amounts to \$1,500. The value of yearly production is \$150,000, though this in no adequate sense represents the firm's business. Mr. E. K. Carley is Superintendent of the Newark factory.

HAUFLER & HOEPPNER, 25 Exchange Alley. The business of hat manufacturing was established by this firm in 1865. All grades of fur hats aro made, including military work. The working force of the factory numbers 35 hands, and the weekly pay roll amounts to \$700. The value of annual production is \$40,000, and the goods are sold to the trade.

W. I. MOORE & CO., 72 to 78 River-street. This firm began business in 1872, and its members are Messrs. Wm. I. Moore and John W. Green. Their productions comprise men's stiff and soft fur liats, and all of the finest quality. These goods are sold to the custom trade only, and the firm's sales extend throughout the country, and they also have a direct exporting trade with Cuba. The working force of the factory numbers 90 hands, and the weekly pay roll is \$1,100. Although recently started, Messrs. Moore & Co. have a prosperous and increasing business. The value of their annual production reaches \$150,000.

CARL F. SEITZ, 15 to 29 Exchange Alley. This factory was established in 1857, and their products comprise the usual varieties of soft, brush, and ladies' fur hats. Forty-five hands are employed, the weekly pay roll being \$500. The value of yearly production is \$50,000, and the goods are sold to the trade.

SEALY BROTHERS, 121 to 129 N. J. Railroad Avenue. This house was established about twenty years ago, and was long known under the style of Moore & Scaley Brothers. During the present year the first named style was adopted. The productions comprise a fine grade of fur hats for the custom trade. Sales are usually made in the near-by markets. The working force of the factory numbers 40 hands, and the weekly pay roll amounts to \$1,000. The value of annual product is \$100,000.

COREY & STEWART, 711 and 713 Broad-street. This firm was established in 1852 by Mr. James W. Corey. The present style dates from 1863, when Mr. James H. Stewart became associated in the business. The firm's productions comprise fine silk hats, ladies' furs, and a line of straw hats made from the finest braid. Their silk hats are everywhere acknowledged as unsurpassed, and are noted for an improved hat brim, patented by the firm. These goods are sold to fashionable dealers in Boston, New York, Philadelphia, and other metropolitan cities. The ladies' furs made by this firm are of the finest kind, and in this respect Messrs. Corey & Stewart fully equal the leading New York houses.

The business of this firm is carried on in a magnificent iron front building on Broad-street, the fashionable thoroughfare of Newark. Their salesroom is perhaps the most elegantly appointed retail establishment in Newark, and is hardly excelled in New York or Philadelphia. The firm have made expressly for their trade an extra fine grade of felt hats. In their manufacturing department 25 hands are employed, and the weekly wages are \$650. The value of yearly production is \$125,000, though this in no adequate sense represents the firm's whole amount of annual sales. They also do an extensive business in ladies millinery, including straw goods, laces, feathers, flowers, etc.

YATES, WHARTON & CO., 142 to 152 Commerce-street; Salesroom, 42 and 44 Green street, New York. This well known house was established in 1858, and the members of the present firm are Messrs. Henry J. Yates, John Wharton and William D. Yocom. A general line of fur hats is made, and the firm's sales extend to all parts of the United States. The working force of the factory numbers 200 hands, and the weekly pay roll amounts to \$3,000. The firm's business, however, includes the operations of other factories. Their total yearly production is valued at half a million dollars.

DANIEL SPILLANE, 167 Market-street. The products of this factory are silk hats, and the business has been established five years. Seven hands are usually employed, with a weekly pay roll of \$125. The annual product is valued at \$12,000.

JOSEPH MERCY, 6 to 10 Division Place; Salesroom, 462 Broome-street, New York. This manufactory was established in 1868. The products comprise felt hats of all grades, a specialty being brush hats. In the factory proper 100

hands are employed, the weekly pay roll being \$1,400. The work of other factorics is included in the operations of this house, and the stated annual business amounts to \$250,000. These goods are sold to the trade generally throughout the country.

P. W. VAIL & CO., Market and Union streets. This house was established thirty years ago at Belleville, N. J., under the style of Vail & Yates. About ten years afterward the factory was removed to Newark. The present firm was organized about fifteen years ago. Their manufactory is one of the largest in the United States, and the products comprise felt hats in all varieties. The statistics of the factory are included in the general summary.

LIQUORICE MANUFACTORY.

NEWARK LIQUORICE WORKS, Bloomfield Avenue and Morris Canal. At this concern is manufactured the solid extract of liquorice from the root, which is brought from the shores of the Mediterranean sea. This factory is the only one of the kind in the United States, and the business is carried on by a firm from London, England. The industry has been possible in this country owing to a recent change in the American tariff, whereby liquorice root was admitted free. The business as carried on in Newark is very extensive, and the liquorice is sold in bulk, mainly in the Southern and Western States, where it is used in flavoring tobacco. The required statistics were respectfully refused by the gentleman in charge of the works.

PUMP VALVE, AND KETTLE AND CAN EAR MANUFACTORY.

JOSEPH EVANS, 64 High-street. The products of this factory are Evans' patent pump valves; also, pail, kettle and can ears, etc. These articles are sold to jobbers and manufacturers in all parts of the United States. Six hands are employed in the factory, and the weekly pay roll is \$60, the annual production of these goods being valued at \$12,000.

RUBBER WATCH CASE MANUFACTORY.

HALSEY'S PATENT BOX AND CASE COMPANY, Nassau Works. At this manufactory rubber watch cases are made, and it is the only concern of the kind in the world. The rubber cases are made entirely by machinery, and the various processes were invented and patented by Mr. William II. Halsey, who is well known in Newark as a principal stockholder and superintendent of the Celluloid Novelty Company.

These cases are the only watch cases made wholly by machinery. A metallic base, made from a composition metal, known as American sterling, is used, and on this the hard rubber is securely fixed by powerful pressure and other methods. The rubber case made by this Company is the cheapest article of the kind in the market, and is at the same time not lacking in artistic appearance, being also capable of claborate and beautiful ornameutation. Their cost is 25 per cent less than silver, and 50 per cent cheaper than gold.

This Company was organized by special act of the State Legislature in 1870, and the officers are as follows: President, D. N. Ropes; Treasurer, George Goodyear; Superintendent, W. B. Learned. The goods have only been on the market during the last six months. They are everywhere received with favor, and the productions of the factory are rapidly increasing. Facilities have been provided for a yearly product of 7,500 cases. At present 25 hands are employed, and the weekly pay roll is \$200. From present indications the value of yearly production will be \$100,000. Cases are made for both ladies' and gentlemen's watches, and the goods are mainly sold in the Western markets. New and attractive styles are constantly being introduced.

SEWING SILK MANUFACTORIES.

Silk, by its characteristic and durable qualities, as well as by the richness and beauty of its appearance is in relation to textile substances what gold is to metals. Silk of all filamentary substances gives the finest, most durable and elastic threads. During recent years the manufacture of sewing silk and silk twist has so increased in the United States that the importation of these arti-

cles is now inconsiderable. The facilities of manufacture have been increased by the introduction of better methods and improved machinery.

NEWARK CITY SILK MILLS, 236 to 248 Bank-street; Singer Manufacturing Company, proprietors, 34 Union Square, New York. The efforts made to secure the statistics of this manufactory were unsuccessful, owing to the temporary absence of the gentleman in charge of the works. This is to be regretted, as the establishment referred to forms a prominent part of Newark's industries.

The efforts of the Singer Sewing Machine Company have resulted in still further perfecting and increasing the manufacture of American sewing silk and machine twist. The demand for a superior article of silk twist has in great part resulted from the extensive sale of the Singer sewing machines. To supply this demand and at the same time secure a superior article, the Singer Company began the manufacture of silk twist in Newark. The most improved machinery and methods were adopted, and the Singer twist is now regarded as unexcelled. These mills are now among the largest in the country and from careful inquiry the value of annual production cannot be less than half a million dollars. The principal works of the Singer Manufacturing Company for the manufacture of sewing machines are at Elizabethport, New Jersey, and contain over eight acres of flooring, with a capacity of turning out over a thousand machines a day.

CHAS. LOVATT, 36 Crawford-street. The raw silk used at this manufactory consists entirely of Chinese importation. In fact, Italian silk is scarcely used at all in this country for the manufacture of sewing silk and silk twist. The silk factory at the above location, of which Mr. Charles Lovatt is now solo proprietor, was established in 1868. The products comprise sewing silks and twists, and sales are mostly made to consumers and jobbers in the New York market. Twelve hands are employed, and the weekly pay roll is \$125. The value of yearly product is \$20,000.

SCRIMSHAW PAVEMENT.

A. P. CORY, Spring-street; Office, 766 Broad-street. A feature of Newark's industries especially worthy of mention, is the manufacture of the Scrimshaw concrete pavement. This article is made from hard flint gravel, sand and coal ashes properly mixed with coal tar and asphalt. As an artificial product for the paving of streets, side and garden walks,

etc., the Scrimshaw pavement was first laid in various parts of this city during 1869. Enough time has since elapsed to show the enduring qualities of the article, and its great utility as an artificial product for the purpose named, and also for carriage drives and stable floors. The pavements first laid are still intact and in excellent condition, thus showing its great superiority.

The first owners of the patent, Messrs. S. B. Brittan & Company, were successful in spite of much opposition and prejudice. The present proprietor, Mr. Amos P. Cory, became their foreman in 1871 and has since, including the years of his proprietorship, been actively engaged in personally superintending the various processes of manufacture. The result is that through his efforts the Scrimshaw pavement has been improved and perfected in durability, color and general appearance. He is still trying, and with great success, to still further improve the article. While some pavements have been found worthless it is fully established that the "Scrimshaw" is unsurpassed and scarcely equaled, as cheap, durable and handsome. Only the best material is used and the most skilful labor is employed by Mr. Cory in preparing and laying the material. When completed it forms a solid mass, perfectly noiseless, and free from dust. Prominent among the many places in Newark which have been laid with the Scrimshaw pavement is the broad walk in front of the Exposition buildings.

During the last two years Mr. Cory has introduced the manufacture of Buell's artificial stone. The supreme merits of this stone for purposes of ornamentation are rapidly becoming better known. Although this branch of industry as carried on by Mr. Cory is quite extensive it is of such a nature that definite statistics could not be ascertained.

BREWERIES.

Malt liquors have been in use from the earliest ages. Herodotus, who lived 450 years before the Christian era, mentions the fact that the Egyptians used a liquor extracted from barley. Tacitus states that the ancient Germans "for their drink drew a liquor from barley or other grain, and fermented it so as to make it resemble wine." Ale was the favorite liquor of the Anglo Saxons. In the early periods of English history ale and bread appear to have been considered equally as victuals or actual necessaries of life. Previous to the year 1700, tea, coffee and chocolate were little known in England, and ale

and beer were used in their stead. In 1748 the Peet Laureate Warton, in an Ode to Oxford Ale, deprecated the waning popularity of a beverage which had been an important element in the growth of English vigor and endurance.

It is interesting to learn that soon after the Puritans landed in New England active public measures were taken to promote the manufacture of beer, and in 1629 mention is made that a shipment of hops and 45 tuns of beer was received in the Plymouth Colony from the ship Talbot. The first successful brewery in Massachusetts was erected in 1637. Brewing in the United States is now a great national industry, and the facts show a rapid increase in the production of ale and beer during recent years.

It seems that the first efforts at brewing in Newark, of any account, were made at the close of the last century. The business has had a constant growth and it is now one of the chief industrial interests in this city. Newark, in addition to the home market, supplies a large area of country with ale and beer. The excellence of Newark ales is everywhere acknowledged. As will be shown farther on this result, is mainly due to the efforts of one house alone. From authentic sources it is learned that the sales of ale in Newark for 1873 was 132,381 barrels, and of beer, 288,063 barrels. The total valuation was \$3,231,171. These results make Newark one of the first cities in the United States in the production of malt liquors.

P. BALLANTINE & SONS, Front and Fulton streets; Branch office and salesroom, 134 Washington-street, New York. An institution whose growth has been almost continuous with the development of Newark as an industrial city is the establishment known as P. Ballantine & Sons' brewery and malt houses. The business was first established in Albany during 1820 by Mr. Peter Ballantine. At that time the brewing industry of this country was comparatively in its infancy, he was therefore a pioneer in its development. Mr. Ballantine removed to Newark in 1840, and then began those efforts which have since produced such stupendous results. As an inevitable outgrowth of scientific labor and years of patient industry, aided by great business foresight and energy, this firm has now perhaps the largest brewing establishment in the United States Mr. Ballantine began the business in Newark at a time when all previous attempts at brewing ale in this city had been uniformly unsuccessful. He quickly instilled new life into the business, and in the end was instrumental in teaching others what an English poet called the noble art of brewing. He is now in his eighty-third year, though still hale and hearty. For several years his sons have been associated with him in business, and the members of the present firm are the senior proprietor already mentioned and his three sons, Peter H., John H. and Robert F. Ballantine.

The location of the firm's property is admirable for facilitating business, having a fine frontage on the Passaic River, so that grain, coals and other material can be received or shipped with great convenience. The buildings cover

about five acros of ground, and are provided with the most improved machinery and arrangements. The brewery proper is five stories high and measures 80x150 feet, with an additional wing 65 feet square. The principal malt house is eight stories in height, and measures 75x175 feet. As one approaches Newark from New York, by rail or river, this establishment is perhaps the most prominent object in view. And, centrally located, on one of the main buildings is a tower of fine proportions, from which a magnificent view of the city of Newark and the surrounding country may be obtained. From the eastern windows the spire of Trinity Church in New York may be seen.

Details as to the extent of this immense establishment are of trifling importance, however, compared with the firm's superior methods of manufacture. The most important recent development in brewing is the application of chemistry in verifying methods long in use, and as a means of discovering new and improved processes. In these days of accurate knowledge nearly everything is valueless unless capable of standing the tests of science. In this respect Messrs. Ballantine & Sons are fully in advance of the times. Their brewery is not without its laboratory and an experienced chemist is constantly employed in analyzing materials and products.

Messrs. Ballantine & Sons largely supply the markets of the Eastern, Middle and Southern States with ale and porter. To carry on the extensive operations of the firm, 175 workmen are required, and the weekly pay roll amounts to \$3,000. The annual production of malt liquors is valued at \$700,000. The acknowledged excellence and extended reputation of P. Ballantine & Sons' Newark Ales is a source of genuine pride to the city in which they are produced.

LYON & SON, 95 to 103 South Canal-street. The Newark ale and porter brewery known under the above style was established in 1864 by Mr. Daniel M. Lyon. The business was thus continued until 1868 when the present firm was formed by the admission of his son, Mr. William H. Lyon, as a partner. Although started but ten years ago the firm has now an extended business, and their sales extend throughout a great part of New Jersey. Their products comprise porter. xx, xxx, and stock ales. Thirty hands are employed in the brewery, and the weekly pay roll is \$400. The value of yearly product is \$240,000.

MORTON & BROTHERS, 235 to 241 High-street. The brewery conducted by the above firm is doubtless the oldest in Newark. It was built some years before the beginning of the present century. Extensive additions have, of course, since been made, but the old walls and timbers which bear the impress of age still remain. The present firm, or their father, Mr. Thomas Morton, began the business in 1832, and previously General Alexander Cummings

carried on the business. The members of the present firm are Messrs. Thomas, Robert and John Morton. The productions are ale and porter. Thirty hands are employed in the brewery, and the weekly wages are \$630. The value of annual product is \$105,000.

MALT MANUFACTORY.

F. G. & I. N. VAN VLIET, Commercial-street. The business of malt manufactory was begun by the above firm during 1873 and the malting processes are carried on in the extensive building formerly used for a flouring mill. Forty hands are employed, and the weekly pay roll is \$500. The yearly production of malt amounts in value to \$375,000. Sales are mostly made in the Newark and New York markets.

The manufacture of lager beer is carried on in Newark for an extended market. The collection of facts relating to each brewery has been found to be impracticable. It seems, however, that the pioneers in the manufacture of Newark beer are the present firm of Schalk Brothers and their predecessors. The firm mentioned, together with others, largely supply the New York market with beer. The statistics presented in the summary concerning the production of malt liquors in Newark were obtained through the courtesy of the Collector of Internal Revenue, and may therefore be regarded as accurate.

CIGAR AND TOBACCO MANUFACTORIES.

BROADWELL & CYPHERS, 181 Market-street. The products of this manufactory are fine cigars, and the efforts of the firm in perfecting the manufacture of cigars are worthy of special mention. The firm began business in April of the present year, and its members are Messrs. J. G. Broadwell and Henry Cyphers. The former gentleman has had long and valuable experience in the business, having been familiar with the cigar trade since 1839. The operations of this firm comprise the manufacture of fine cigars to compete

with the imported goods from Havana. Testimonials on every hand are abundant evidence of their success. The best Havana tobacco is used, and with the same material, by the aid of experience and artistic skill, the imported article is fully equaled. The efforts of this firm constitute an innovation in American cigar manufacturing. They have succeeded in producing cigars equally as good as the imported Havanas, and at a less cost. To show the great care exercised, all the tobacco used is of the best selected grades, and before making up, each leaf passes through the hands of Mr. Broadwell, and the same may be said of each cigar manufactured. The copyrighted brands of the firm are "La Villa Franca," "La Idol," and "La Henrietta." At the present time their sales are mainly in the home and near-by markets. They are rapidly increasing, however, and will doubtless soon extend over the country. In the Newark Industrial Exposition of the present autumn, Messrs. Broadwell & Cyphers made a specially fine display, which won encomiums from all directions. Having been so recently established the statistics of their manufactory could not be definitely determined.

W. A. BRINTZINGHOFFER, 883 Broad-street. This manufactory was established in 1837 by Mr. W. A. Brintzinghoffer who has since continued as sole proprietor. The operations of the manufactory are confined to the production of cigars of all grades. These goods are mainly sold in the home and near-by markets. The working force of the factory numbers 50 hands, and the weekly pay roll is \$600. The yearly product of cigars is valued at \$100,000.

THOMAS KENNY & CO. (Jersey Blue Tobacco Works), 801 Broad-street. This house was established in 1850 under the style of T. Kenny & Son. In 1857 it became T. Kenny, Jr., and was thus continued until this year, when the present firm was formed consisting of Thomas Kenny and Anson Vincent. The productions comprise manufactured tobacco and all grades of cigars. The business, however, is mainly confined to cigar making. The firm's sales are in the New York, New Jersey and Pennsylvania markets, extensive sales being made in Newark. Sixty hands are employed, and the weekly pay roll is \$700. The value of annual production is \$120,000.

DRAIN PIPE MANUFACTORY.

ISAAC OGDEN, (Chestnut-street Pottery and Drain Pipe Works,) Chestnut and McWhorter streets. The products of this factory are vitrified stone drain pipe, and the business was established in 1854. It is the oldest factory of its kind in Newark, and the only one of three whose statistics were available. Eighteen hands are employed, the weekly wages being \$225, and the yearly productions \$60,000. The goods are mainly sold in the home market.

MISCELLANEOUS MANUFACTURES—SUMMARY.

| Misce | llaneous manufactures of every kind | 101 |
|-------|-------------------------------------|-----------------|
| Total | number employees | 5,280 |
| 44 | amount of wages paid weekly | \$55,524.00 |
| 66 | " wages paid per year | \$2,887,248.00 |
| 64 | value of annual productions | \$14,969,000.00 |

Comprising:-

| | | | No. of em- ployees | Weekly Wages. | Aunual Production. |
|-------------------------------|----------|----|--------------------------|------------------|--------------------|
| Varnish Manufactories | | 14 | | | 1,000,000 |
| Clothing " | | 4 | | | 822,000 |
| Hosiery " | | 1 | 400 | 2,500 | 550,000 |
| *Shirt and Collar " | | 5 | 405 | 3,800 | 930,000 |
| Button " | | 7 | 348 | 2,400 | 405,000 |
| Soap " | | 1 | 5 | 75 | 60,000 |
| Enameled Oil-Cloth " | | 4 | 330 | 4,050 | 1,275,000 |
| Glue " | | 1 | 25 | 300 | 60,000 |
| Britannia Ware | | 2 | 21 | 180 | 22,000 |
| Paper Box " | | 4 | 234 | 1,120 | 179,000 |
| Chemical Works | | 7 | 429 | 5,050 | 1,529,000 |
| Ornamental & Bent Glass Work | s | 3 | 48 | 750 | 95,000 |
| Rule Manufactories | | 2 | 20 | 200 | 33,000 |
| Broom " | | 1 | 8 | 90 | 60,000 |
| Oil " | | 1 | 8 | 150 | 100,000 |
| Cotton Thread Manufactories | | 2 | 1,080 | 8,800 | 2,590,000 |
| Lubricator " | | 1 | 3 | 30 | 15,000 |
| Piano Forte " | | 1 | 25 | 350 | 50,000 |
| Wire Ferrule " | | 1 | 4 | 30 | 10,000 |
| Russialine | | 1 | 18 | 234 | 90,000 |
| Ink, Sealing Wax & Mucilage M | anuf'y | 1 | 14 | 150 | 100,000 |
| Telegraph Instrument | " | 1 | 70 | 750 | 200,000 |
| Paint | " | 2 | 11 | 180 | 150,000 |
| Brush | 44 | 3 | 60 | 550 | 95,000 |
| Marble and Stone Works | | 2 | 50 | 1,000 | 90,000 |
| Rubber Coated Harness Trimn | ning Mfy | 1 | 80 | 1,000 | 150,000 |
| Lime and Cement Manufactory | | 1 | 100 | 900 | 350,000 |
| Ultamarine Blue " | | 1 | 26 | 350 | 150,000 |
| Corset | | 1 | 150 | 1,000 | 150,000 |
| Hat " | | 11 | 862 | 12,975 | 1,827,000 |
| Drain Pipe " | | 1 | 18 | 225 | 60,000 |
| Malt | | 1 | 40 | 500 | 375,000 |
| + Cigar and Tobacco " | | 4 | 110 | 1,300 | 220,000 |
| Ale Breweries " | | 3 | 235 | 4,050 | 1,045,000 |
| Silk '' | | 2 | 12 | 125 | 20,000 |
| Pump Valve, Etc., " | | 1 | 6 | 60 | 12,000 |
| Rubber Watch Case " | | 1 | 25 | 200 | 100,000 |
| | | | | | 1 |

^{*} The figures of one manufacturer omitted, see page 201.

[†] The statistics of the Newark Silk Mills not included.

[|] The firm of Campbell, Lane & Co. has been omitted in this branch of industry, which is a fact to be regretted, they being the oldest and largest in Newark. After repeated application for information no one was found at the factory who could give the required facts.

NEWARK INDUSTRIAL INSTITUTE.

From early times fairs and exhibitions have been employed as a successful method of disseminating accurate information concerning the products of a particular country or locality. At first the products exhibited at these fairs were mainly agricultural, and a principal feature of exhibitions in those days was the buying and selling of the various articles shown. Exhibitions purely industrial have only been possible in more recent times, when the prevailing industrial activity has resulted in an immense production of manufactured articles. Perhaps the first successful industrial fair on a large scale was the London Exhibition of 1851.

During the last decade several prominent American cities have held industrial exhibitions with varied succes. With one exception, however, the exhibitions referred to have only been possible by admitting the productions of other towns. The exception referred to is the city of Newark, which has held three successive industrial exhibitions, including that of the present autumn, each of which has been made up entirely of home productions. Probably no other city in the world has, within its own limits, an extent and variety of productions sufficient to provide articles for an interesting and successful exhibition. That the industries of Newark are of such a character has been fully established, and the exhibitions already given have been so successful as to attract national attention.

The first Newark Industrial Exhibition was held in the autumn of 1872 in the building on Washington-street, formerly used for a skating rink, with additional temporary buildings. It was continued about eight weeks with unbounded success, and became exceedingly popular with the people of Newark, and by means of it the fame of their city as a great manufacturing centre was extended to neighboring cities and States. Although many at first doubted the value and even result of the enterprise, its signal success was sufficient to remove previous apprehensions as to the feasibility and wisdom of such an undertaking. The results were no doubt mainly due to the persevering energy of the men who conceived and carried forward, in spite of all discouragements, so laudible an undertaking to its final success.

The Board of Managers were among the most prominent citizens of Newark. The officers were as follows: President, Hon. Marcus L. Ward; Vice-President, Thomas B. Peddie and David Campbell; Secretary, Albert M. Holbrook; Treasurer, Isaac Gaston. Of the gentlemen connected with the enterprise none

were more energetic in directing the preliminary canvass, and assisting to remove the doubts and fears which usually surround new undertakings of this nature, than Mr. A. M. Holbrook. The success of a great industrial exhibition, such as this, greatly depends on a methodical arrangement. This important work, requiring rare executive ability, devolved upon the board of managers, who were ably assisted by the Secretary, and the results showed that he was fully equal to the task.

Prompted by its success, a few weeks before the close of the first exhibition, the Board of Managers resolved to organize a permanent association, and the result was the formation of the Newark Industrial Institute. The capital stock of the new company was placed at \$150,000, with power to increase it to \$300,000, and the greater part of the first named sum was promptly subscribed by the citizens of Newark. The rink property referred to was purchased and a large and attractive addition built, so that the combined buildings covered nearly two acres of ground. The officers of the old association were continued in the new with the exception of President, Hon. Geo. A Halsey succeeding Governor Ward, who was compelled to resign on account of urgent public The present Board of Directors is composed of the following leading citizens and manufacturers of Newark, who feel a deep interest in all matters pertaining to the welfare of their city. The officers for 1874 are as follows! President, Hon. George A. Halsey; Vice-Presidents, David M. Meeker and Charles N. Lockwood; Secretary, Albert M. Holbrook; Treasurer, Isaac Gaston.

BOARD OF DIRECTORS.

| GEORGE A. HALSEY, | Joseph J. Meeker, | CHARLES N. LOCKWOOD, |
|-----------------------|-------------------------|----------------------|
| MARCUS L. WARD, | JOHN M. PHILLIPS, | JOHN D. HARRISON, |
| THOMAS B. PEDDIE, | WALTER M. CONGER, | JOHN T LEVERICH, |
| EDGAR FARMER, | PHINEAS JONES, | JAMES W. COREY, |
| NOAH F. BLANCHARD, | DAVID M. MEEKER, | STEPHEN B. SANDERS, |
| JAMES M. DURAND, | ELI H. REYNOLDS, | James C. Ludlow, |
| MARTIN R. DENNIS, | FERDINAND B. KUEHNHOLD, | ALBERT M. HOLBROOK, |
| WILLIAM JOHNSON, | GEORGE PETERS, | LORENZO BOYDEN, |
| NICHOLAS J. DEMAREST. | HENRY J. YATES, | CHARLES E. YOUNG, |

The Exhibition for 1873, as in the previous year, was limited to Newark productions and the result amply justified the wisdom of the policy adopted. It was one of the most remarkable and interesting displays ever given in the United States, and was deemed worthy of a special visit by the President, members of the Cabinet, General W. T. Sherman, members of Congress, and the representatives of the leading trades of the country, all of whom expressed themselves highly gratified with their visit. That a single city could present so great an array of manufactured artices was a cause of general wonder and astonishment.

The effect was such that many Europeans engaged in studying American institutions made special visits to the Exposition, and thus the fame of Newark's manufactures was carried to European shores.

The Exhibition for 1874, during the present autumn, has been still more attractive, and the Industrial Institute has now grown into an established institution, its future, as a means of still further extending the variety, excellence and extent of the city's productions being full of rich promise for Newark. Mr. A. M. Holbrook, who is also favorably known in connection with Holbrook's Newark City Directory, a model of its kind, is still the active Secretary of the enterprise.

GENERAL SUMMARY.

| Manufactures of every kind | 409 |
|-------------------------------|---------------|
| Total number Employees | 19,971 |
| " amount of wages paid weekly | \$237,285 00 |
| " wages paid per year | 12,328,820 00 |
| " value of annual production | 59,242,671 00 |

Comprising:

| | | No. of em- ployees | Weekly Wages. | Wages paid per Annum. | Annual Production. |
|---|-----|--------------------------|------------------|-----------------------------|-----------------------|
| Manuf's in Celluloid | 3 | 105 | \$1,150 | \$59,800 | \$250,000 |
| " Leather | 81 | 6,415 | 73,310 | 3,812,120 | 14,977,000 |
| " Iron | 100 | 3,759 | 45,210 | 2,350,920 | 7,062,000 |
| " Metals other than Iron | 81 | 2,685 | 38,811 | 2,018,172 | 14,289,500 |
| " Iron and Wood | 12 | 620 | 7,535 | 391,820 | 990,000 |
| " Wood | 31 | 1,107 | 15,745 | 808,740 | 2,459,000 |
| " Miscellaneous Branches | 101 | 5,280 | 55,524 | 2,887,248 | 14,969,000 |
| Estimated production of Beer, Hats, Silk, and balance of Jewelry as referred to upon previous pages | } | | | | 4,246,171 |
| Grand Total | 409 | 19,971 | 237,285 | 12,328,820 | \$59,242,671 |

CONCLUSION.

The present is an age of municipal advancement. A principal result of modern industrial development is the prominence of the City as the dominant element in the civilization of to-day. The great cities of the world give shape and direction to the manners, customs and opinions of modern society. France without Paris would find its intellectual and industrial development immeasurably retarded. England deprived of London would be like Samson shorn of his locks. These results, as indicated, being coeval and mainly the outgrowth of industrial advancement, it follows that the part which a city plays in the productive industry of the country, is an accurate test of its importance as a means of advancing the National wealth and prosperity. And just here it is well to remark that a city's prominence in this regard is accurately judged, not so much by the gross amount of manufactured products, as by the light of valuable contributions made, during years of progress, to the useful arts, in the shape of new inventions or discoveries, or improved methods and processes of manufacture.

In the preceding pages an exposition is made of Newark as one of the principal producing cities in the United States. The results as recorded require few explanations. No attempt has been made to show a great number of manufacturing establishments, as such statistics are, in a measure, delusive as a means of showing the true relation of an industrial city to the National wealth and prosperity. For the purpose of accurately setting forth the importance of Newark in this regard, all those establishments which are properly known as trades, and also those manufactures which are in reality local adjuncts to producing interests proper, have been omitted in this work. To illustrate the latter statement, reference may be made to the making of hat blocks, an industry which is absorbed by the manufacturers of hats. The industries omitted are of some importance, regarded purely as local enterprises, but they possess little interest to the world at large. The statistics gleaned and presented in this work constitute a truthful and complete summary of Newark's industrial products, so far as concerns her relations to the markets of the world. Thus regarded, the results attained are a cause of wonder and astonishment, and are unequaled in the history of American manufactures.

It should be remembered that the statistics given are those of a period of general depression in the industry of the country. It is doubtless true that no other American city has attained to so large an aggregate production of manufactured goods in the same time. One cause of this is the great number of

different industries represented in Newark. The manufactures of no other American city are so diversified as those of Newark.

It is to be regretted that the published statistics of American manufactures, as contained in the census reports, are not of more value as a faithful account of the Nation's industries. The obstacles, however, in the way of so desirable a result as even a fair approximation to accuracy, are almost insuperable, and are well set forth in the preliminary remarks of Hon. Francis A. Walker, the Census Superintendent for 1870. That a complete exposition of a city's industries can only be secured by means of special and determined efforts is evident. With confidence as to its general completeness and accuracy of details, this volume is offered as a contribution to the industrial literature of the country.

The Census report for 1870, whatever may be its value, gives the gross amount of production in Essex county, of which Newark is the capital, as \$52,108,958. In this was included all factories whose yearly product is valued at \$500. The figures of the census report are given, not for the purpose of comment, but rather as an indication of the great statistical result which would be reached, taking as a basis the figures recorded in the preceding pages, should all minor establishments and industries purely local be included, and especially in a year of such general prosperity as was 1870. To accurately estimate the result is impossible. Enough is known, however, to conclusively show that in the value of annual manufactured products Newark is the third, if not the second, city in the Union.

A classification, however, of Newark's industries, such as is herewith presented, is necessary to fully show the city's industrial supremacy. Only through diversified industry, which this city has reached, was the Newark Industrial Exposition possible. Little interest would be attached to an exhibition made up almost entirely of locomotives and carpets; iron and glass; boots and shoes, or any single line of production. Especially, however, is the City of Newark worthy of honorable distinction when the inventions, discoveries, and better processes which her citizens have contributed to American industry are considered. The facts relating to these developments have already been recorded and need not be repeated here. Were the matter obtainable, a comparison would show that in this respect Newark is preëminent. The leaders in her industries have been pioneers in many of those industrial advancements whose results have been an increase in the comforts and conveniences of society. A recent development, as carried on in Newark, is the manufacture of American tea trays and stove platforms, from the inventions and efforts of Mr. Walter M. Conger.

A distinguishing characteristic of Newark's productions is their uniform excellence and high quality. This is true in all the various lines of production. Shoddy goods are not produced in Newark workshops. No city in the Union better illustrates the value of morals in art.

In the light of these facts it is not surprising that Newark should be promi

nent in what are known as ingenious industries, and that no city in the country has a class of mechanics and artizans of greater skill and intelligence.

Among valuable inventions which have had their origin in Newark, may be mentioned the Baxter steam engine, which was invented in 1868 by Mr. William Baxter, who is now as then, a resident of Newark. This engine, which is now used throughout the country, is an acknowledged improvement of great value over previous methods of utilizing steam power. Its extraordinary merits are now so well known that to mention them here in detail would be superfluous. Experience has shown that it is the simplest, safest, most durable and most economical small power engine ever invented. Mr. Baxter was associated with Mr. Wm. D. Russell, another citizen of Newark. Afterwards the Baxter Steam Engine Company was organized, of which Mr. Russell is now President. The office of the Company is at 18 Park Place, New York. This engine is made by the Colt's Arms Company on the interchangeable plan. Mr. Russell is also a resident of this city, and the Baxter engine is justly regarded as an outgrowth of the genius, energy and capital of Newark. Since inventing his engine Mr. William Baxter has been engaged in perfecting a steam canal boat, and he has recently, in this direction, achieved the fullest success, having been awarded the prize of \$100.000 offered by the Legislature of New York State for the successful application of steam in propelling canal boats.

Owing to the close proximity to New York, the commercial metropolis of the country, many of the Newark manufacturers have offices and salesrooms in that city. The tendency during the last few years has been in the opposite direction. By means of the Industrial Institute, and the personal exertions of manufacturers, Newark is becoming known as a principal source of supply for the manufactured products of the country. As a result of this knowledge buyers are finding it to their interest to come direct to Newark and purchase from first hands. The interests of this city are no longer local, but national; and more, the products of Newark workshops are now sold in the markets of the world. The means of rapid communication which Newark has with other parts of this country and the world, are ample. By the great trunk lines, the Penn. Central, N. J. Central, Erie, and Del., Lack. and Western Railroads, the transportation facilities to the West are unsurpassed, and with the prospective improvement of the Passaic River direct water communication will doubtless be effected with the South Atlantic States. With the North and East, Newark is in quite as active sympathy, by means of the numerous railroads, as New York itself. That the interests of this city are becoming more centralized seems certain, and this tendency will no doubt continue until the City of Newark is recognized throughout the world as a great mart for the sale of manufactured products. In securing these desirable results a main element is the dissemination of accurate information concerning the nature, variety, and extent of the city's productions. In the confident and earnest belief that this work is an important contribution to that end, it is respectfully submitted by the Publishers.

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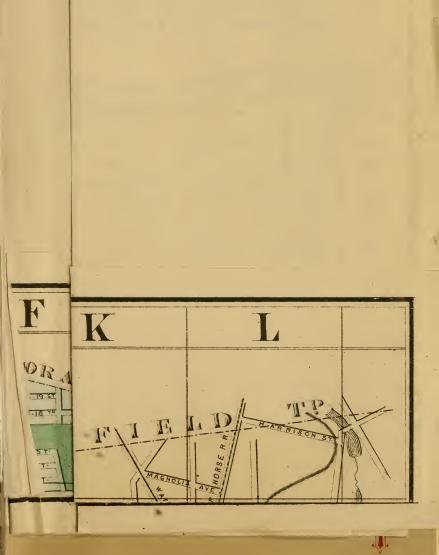
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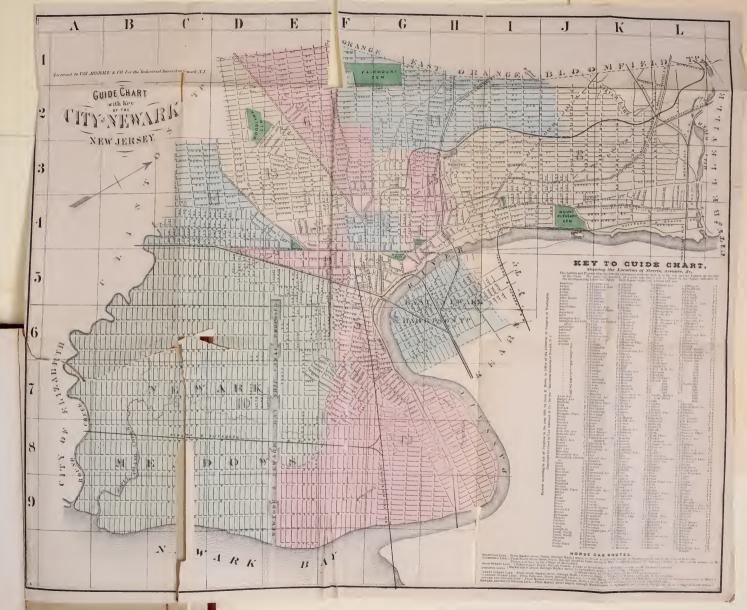
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THE

INDUSTRIAL INTERESTS

OF

NEWARK, N. J.

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